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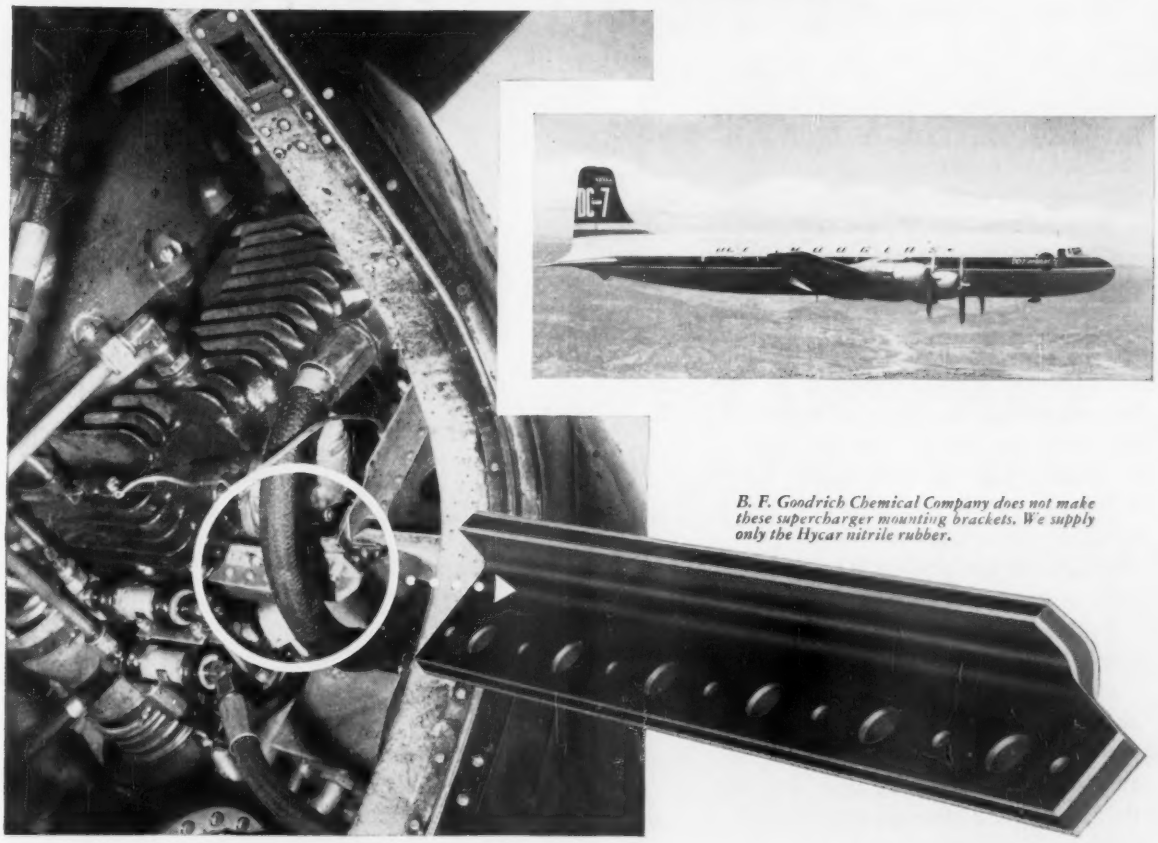

B. F. Goodrich Chemical Company does not make these supercharger mounting brackets. We supply only the Hycar nitrile rubber.

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PARTS inside an aircraft engine nacelle operate in a tough environment. This is where you'll find Hycar —where there is contact with oil, where temperatures run from minus 65 to plus 300, where take-offs and engine runups cause terrific strains and shattering vibration.

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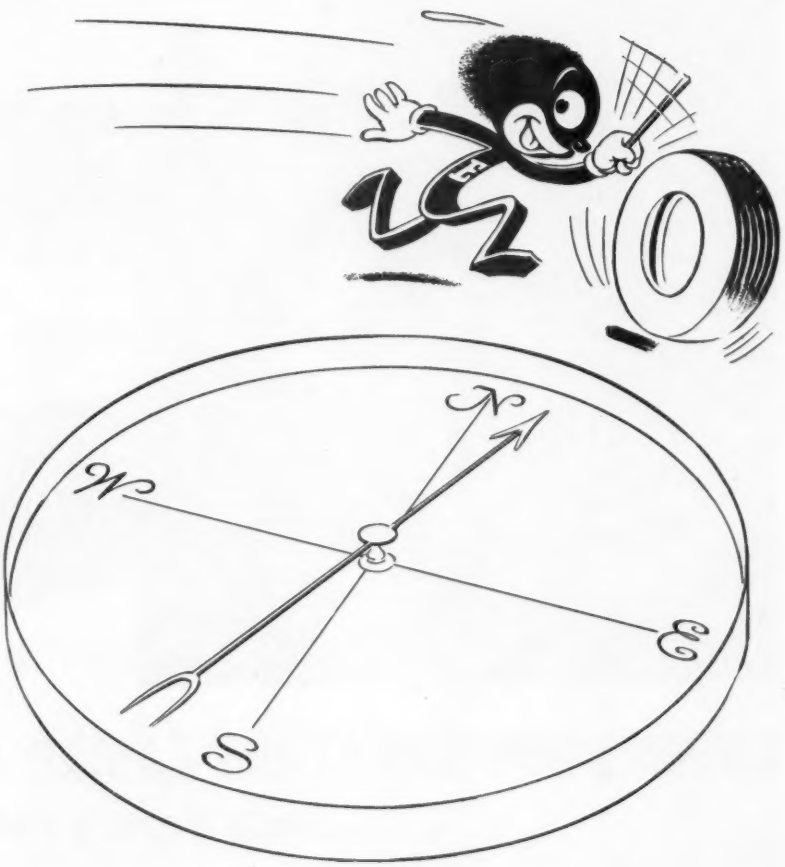

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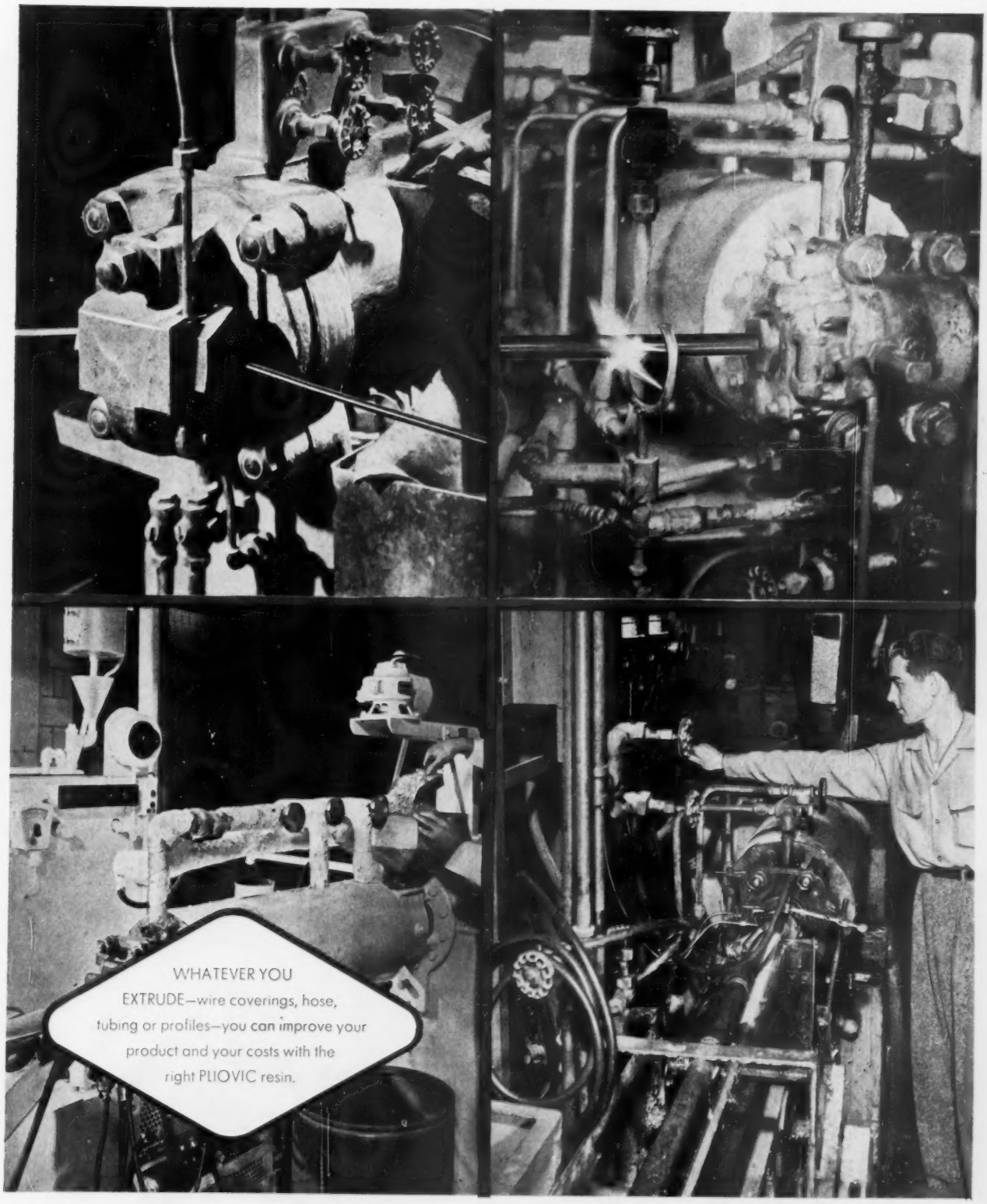
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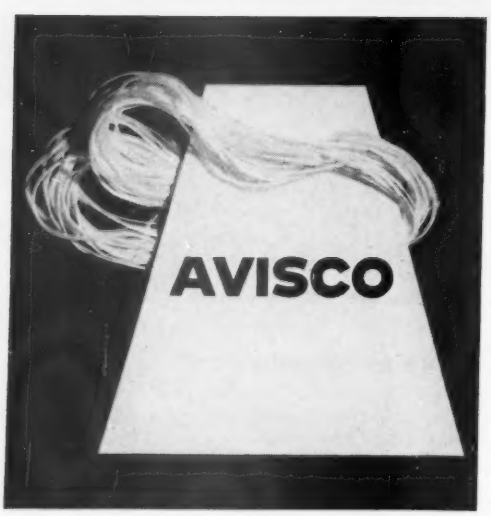

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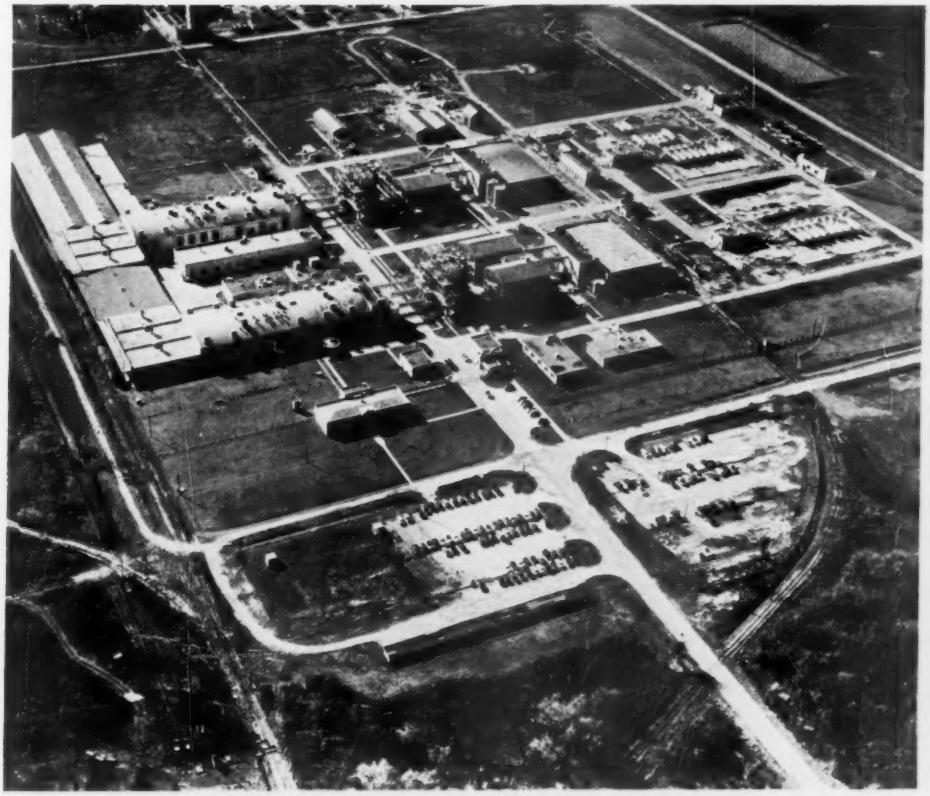

PLIOFLEX 1000
—hot, nonpigmented, staining type

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PLIOFLEX 1006
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PLIOFLEX 1502
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PLIOFLEX 1703
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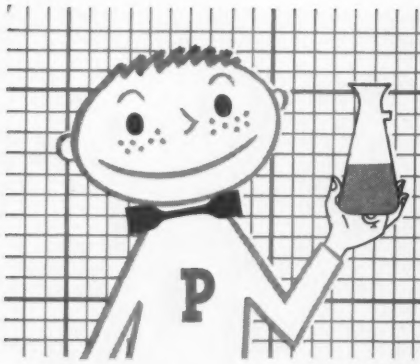

Philprene®

TECHNICAL NEWS

Philprene 1605 For Improved Physical Properties and Processability

Many characteristics must be considered in mechanical goods compounds. Among these are: (1) physical properties, (2) compound cost, (3) rapidity of mixing, (4) extrusion rate, (5) die swell or shrinkage, (6) staining, etc. For many years mechanical goods manufacturers have used GR-S-1104, a hot rubber-Philblack A masterbatch, for its easy processing and good physical properties. This masterbatch contains a slightly staining antioxidant and thus has some limitations.

Compounding Recipe

Masterbatch	**150**
Zinc Oxide	**3**
Stearic Acid	**1**
Sulfur	**1.75**
Santocure	**Variable**
Softener	**5**
Antioxidant	**1**

The current trend is toward improved physical properties in many applications. In several instances, GR-S-1104 cannot quite meet requirements. Since cold rubber possesses better physical properties, a cold rubber-Philblack A masterbatch . . . called PHILPRENE 1605 . . . has been prepared. PHILPRENE 1605 contains a non-staining antioxidant to qualify it for a greater number of applications.

Laboratory and plant information show that PHILPRENE 1605 possesses better stress-strain properties and improved extrusion performance. Manufacturers report the following advantages of PHILPRENE 1605 compared to GR-S-1104:

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3. **Mixing time 10 per cent shorter**
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The laboratory data below demonstrates the superiority of Philprene 1605:

Cure: 30 minutes at 307°F							Garvey Die Extrusion at 250°F		3/16" Round Die Extrusion at 125°F	
Master-batch	PHR Santocure	Com-pression Set %	300% Modulus psi	Tensile psi	Elongation %	Shore Hardness	Inches per minute	Grams per minute	Grams per meter	Shrinkage %
PHILPRENE 1605	1.0	16.7	1760	2880	525	61	35.8	70.8	37.05	45.5
PHILPRENE 1605	1.25	12.8	1900	2830	475	63	35.2	71.5	37.30	45.8
GR-S-1104	1.3	17.6	1800	2500	420	57	30.8	70.2	45.15	55.1

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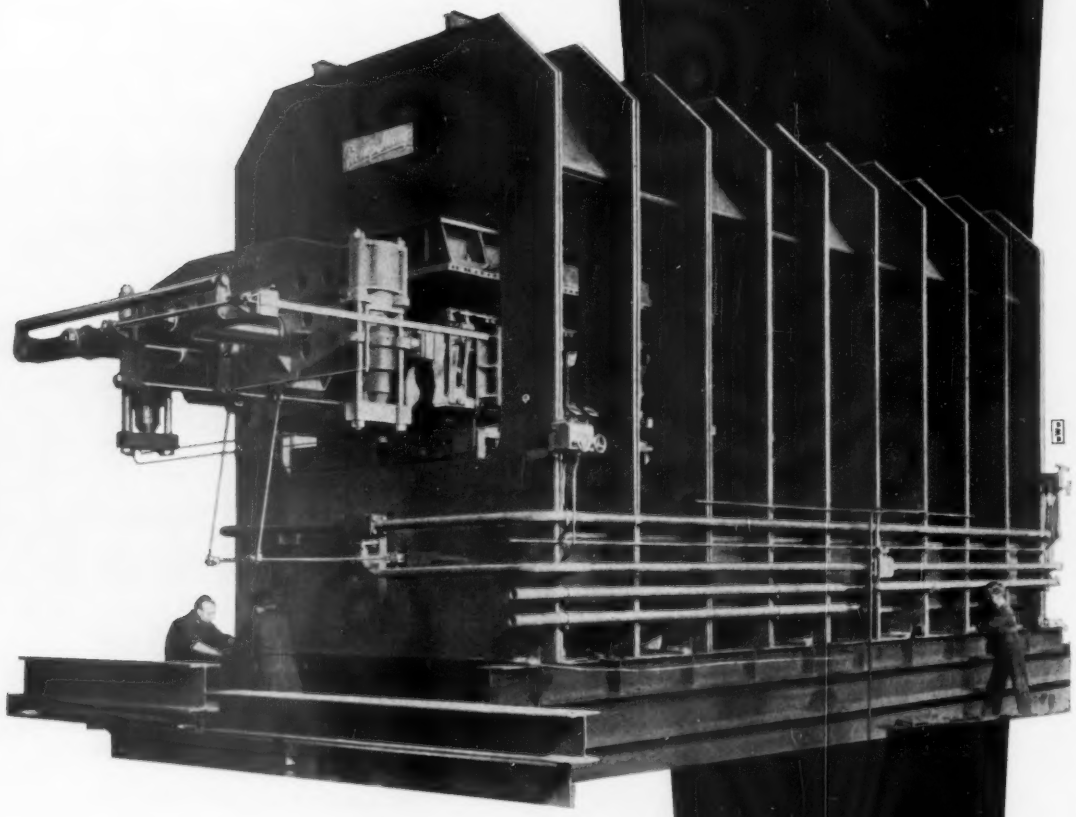

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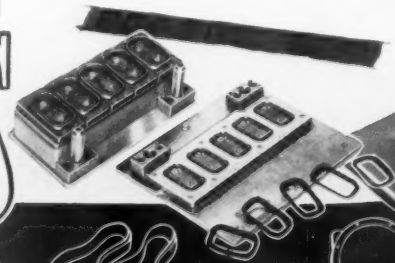

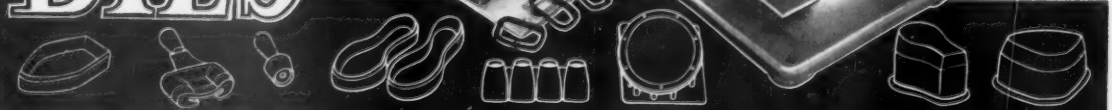

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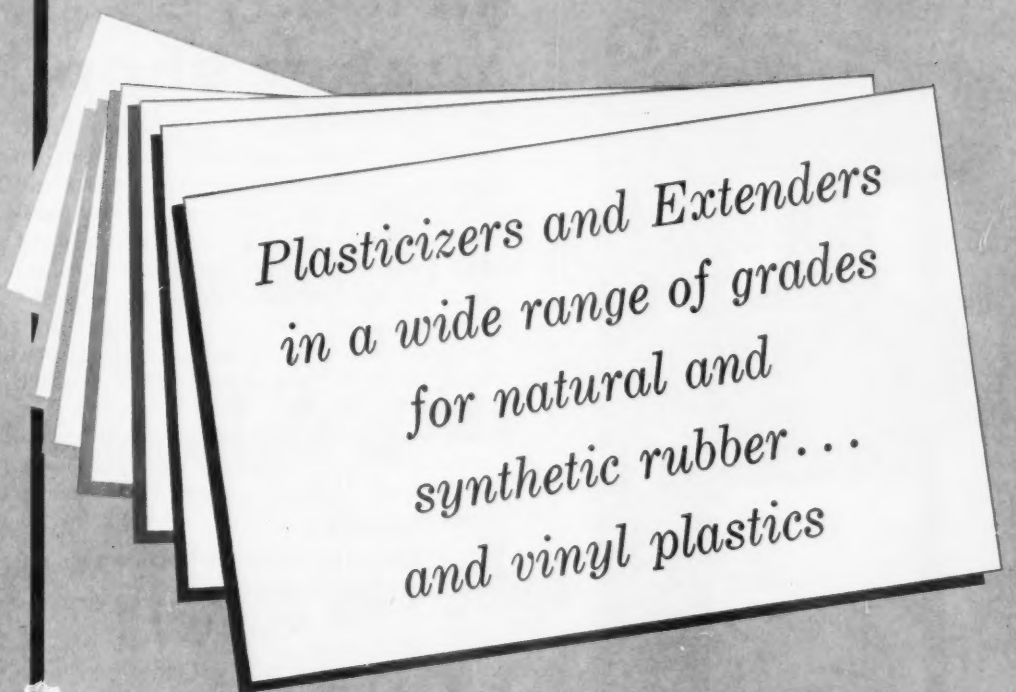

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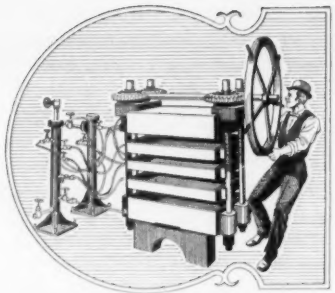

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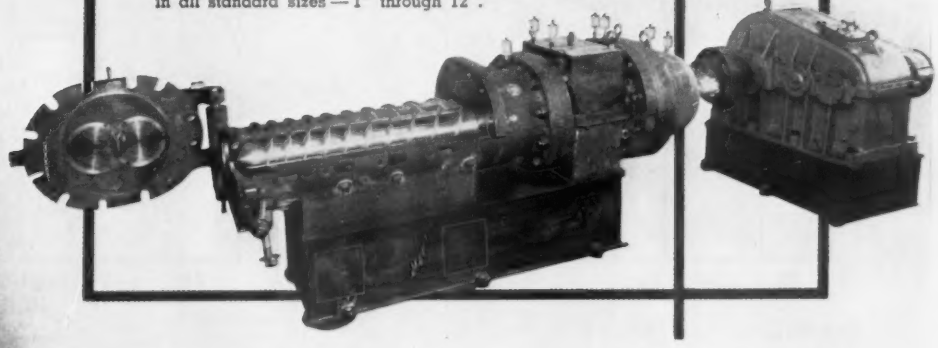

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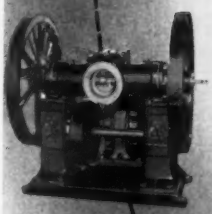

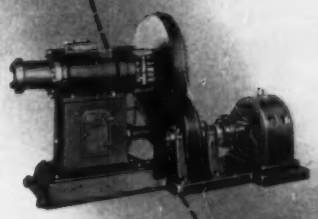

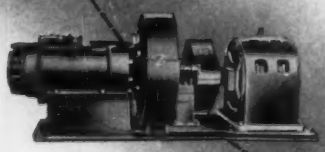

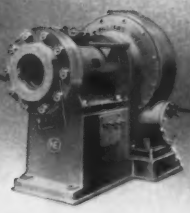

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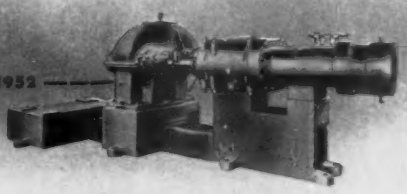

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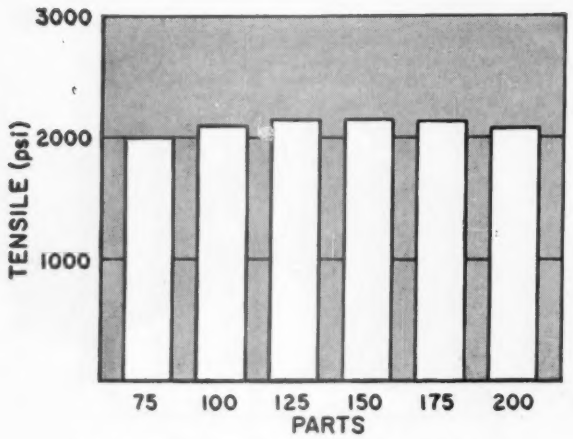
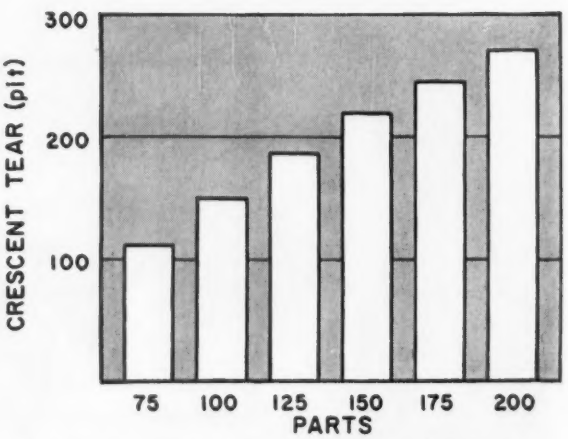
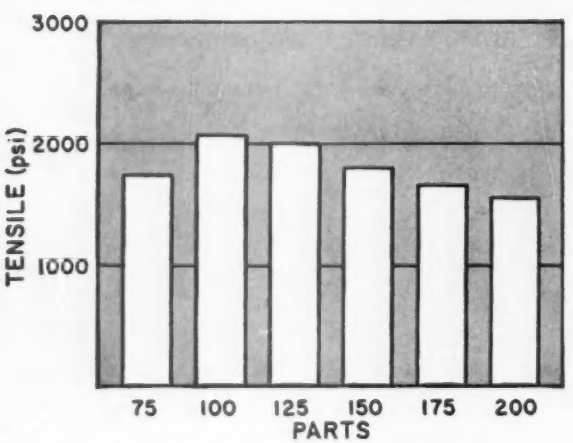
See how you can give GR-S high tear resistance / tensile strength with Super Multifex®

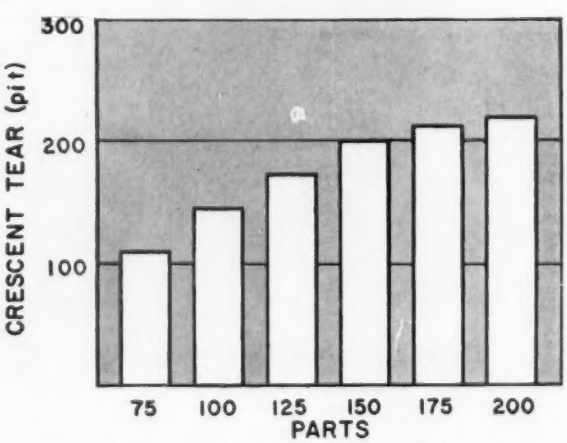




Use DIAMOND Super Multifex in your GR-S compounds for maximum tear resistance, high tensile strength, and excellent flex life. This precipitated calcium carbonate has extremely uniform, ultra-fine particles (.03-.04 microns), coated to aid dispersion, mixing and processing. Try it in your next order.

and Multifex® MM





Multifex MM is an uncoated, ultra-fine particle (.05–.06 microns) precipitated calcium carbonate. It reinforces GR-S by giving good tear resistance, tensile strength and flex life. Call your DIAMOND representative today for information and technical help on these and other high-grade calcium carbonates. Or write DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.

DIAMOND SALES OFFICES: New York, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Chicago, St. Louis, Memphis, Houston.

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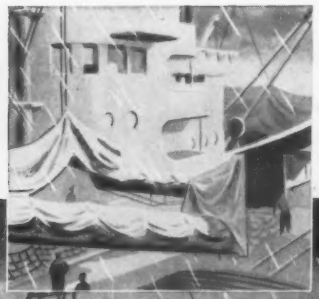

WELKOTE—Wellington Sears nylon backing fabric, when neoprene or vinyl-coated, combines light weight plus strength for a multitude of protective covering uses. Besides all-weather hatch tents for shiploading, these include playing field covers, machinery and freight tarpaulins, fumigation tents, etc.

Wellington Sears fabrics back up the versatility of these coated materials

For coated auto and furniture upholstery, luggage, handbags, wall coverings and many other end uses, Wellington Sears backing fabrics include cotton sheetings and drills, twills, sateens and ducks; spun rayon, "Welkote" filament nylon and other synthetics; "KnitKote" cotton knit fabric; "Lantuck" and "Lantuck-NR" (nylon-rayon) non-woven fabrics. All end-use "engineered."

American industry today is setting no limits to the possible uses of coated materials. And there's more to these materials than meets the eye. Beneath the colorful and serviceable surface, there is a backing fabric that provides the basic strength.

But there's still more to this "inside" story. Because of special problems of tear-strength, durability, flexing, weather resistance, tailoring qualities, adhesion and the like, this backing fabric must be carefully *engineered* for each type of application.

This is where Wellington Sears enters the picture. Nowhere else will you be able to match our many decades of experience with fabrics of this type. And nowhere else will you find such a complete range of different base fabrics for every conceivable plastic and rubber coating use.

Wellington Sears makes the backing fabric only—not the finished coated product. So, if you have a coating problem—or any problem that involves fabric in combination with rubber or plastics—let our experience go to work for you. For booklet, "Modern Textiles For Industry," address Dept. G10.

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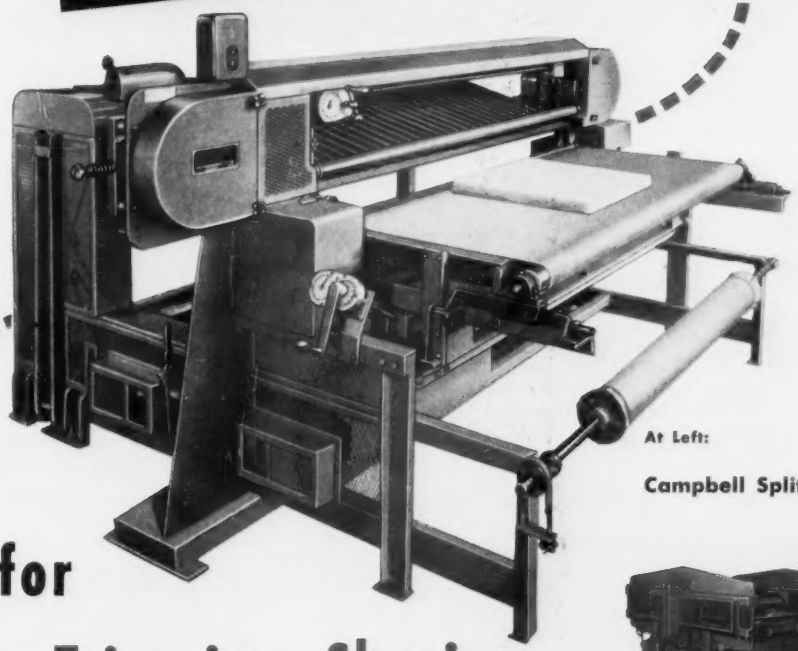
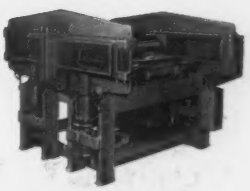


At Left:

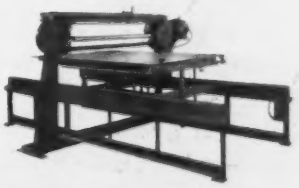
Campbell Splitter

for

Cutting, Trimming, Shaping



Roller Die Cutter



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many different materials including Polyurethane, Polyester and Polyvinyl Plastics, Foam Rubber, Rubberized Hair, Felt, etc. With the Campbell Splitter, Roller Die Cutter and Cushion Cutter you can take stock in slabs, sheets and rolls and reduce the material to the exact size, shape and thickness you need for your job. Speed every trimming, cutting and shaping operation in your shop with FEMCO-Built Campbell Designed Special Machinery.

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Architects: Six Associates, Inc.

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And so along the entire industrial front. The gains have been great—they will be even greater from now on. In the modern research laboratory you see above, a highly trained and skilled technical staff is finding new ways to improve rayon and widen its role in industry.

The textile industry can look to American Enka for the products of tomorrow.

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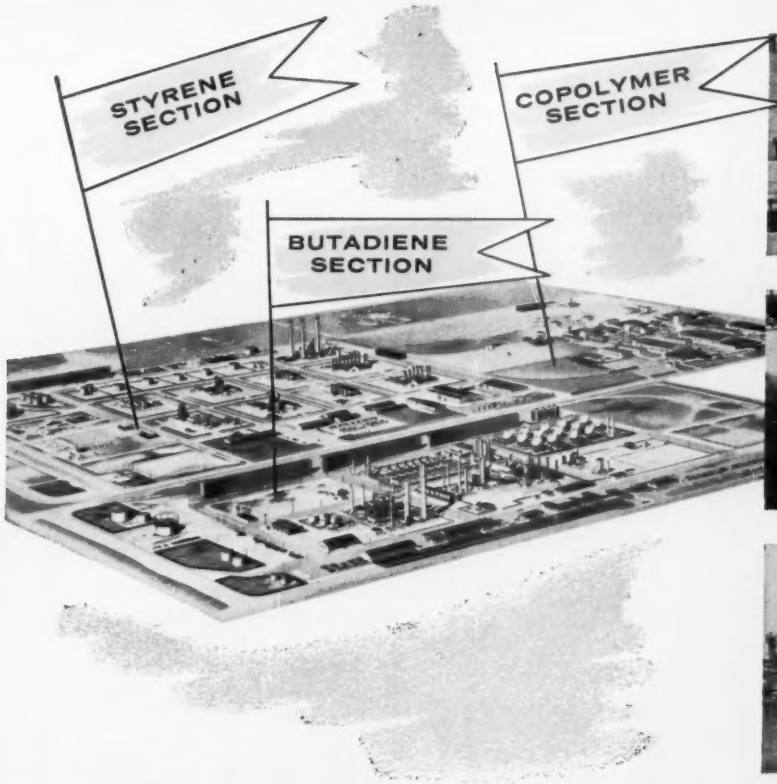
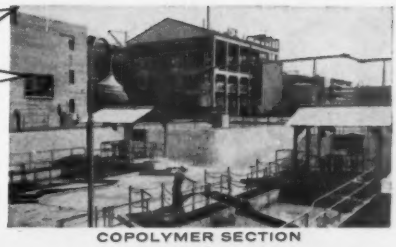
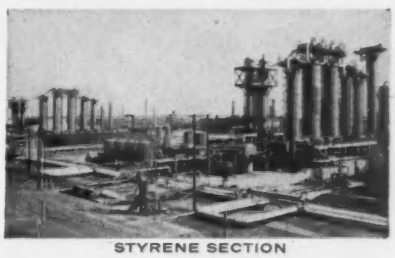



COPOLYMER SECTION

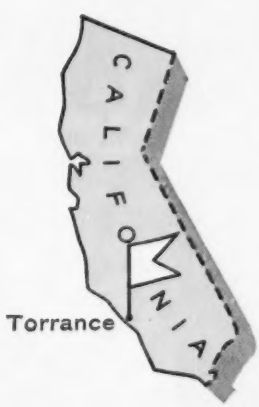
BUTADIENE SECTION


STYRENE SECTION

In the West...

Here's the handy source of

Synthetic Rubber



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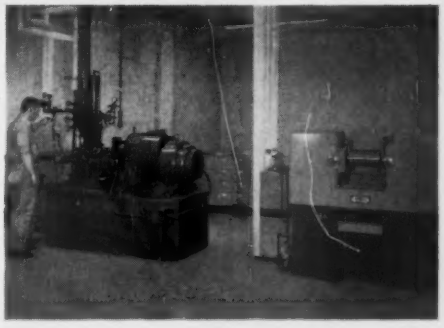
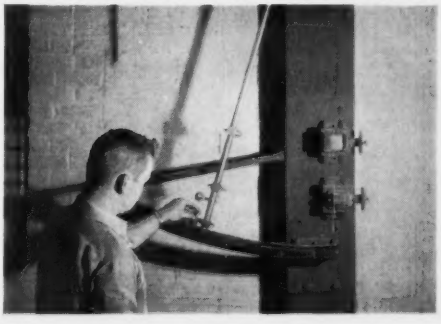
RUBBER INDUSTRY

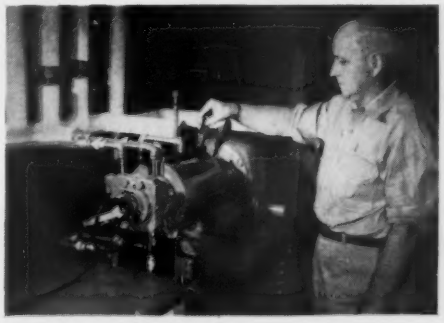
Entrance to Witco-Continental's office and technical service laboratory at Akron, Ohio.



Inside Akron laboratory. Banbury mixer compounds rubber formulations. Rubber mill at right.



Rebound machine tests resiliency of rubber compounds containing Continental Carbon Blacks.



Tuber determines extrusion characteristics and provides samples for subsequent testing.

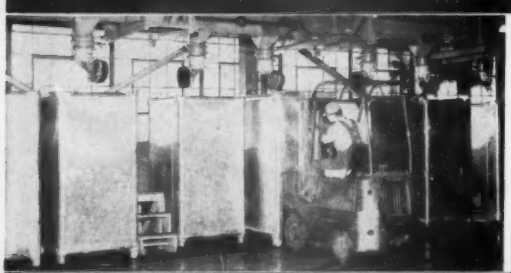
here's how GOODYEAR saved $100,000 and gained flexibility with TOTE* SYSTEM

THE PROBLEM — To install at the Goodyear Tire and Rubber Company's plant at Topeka, Kansas, a materials handling system to unload various types of carbon black; provide temporary storage; and make automatic deliveries of carbon black to the Banbury mixers.

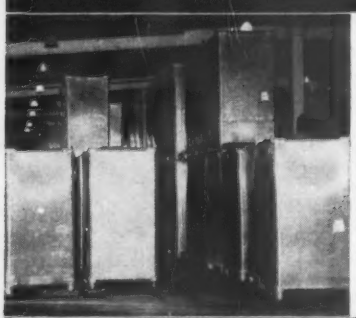
THE SOLUTION — Tote System—a **complete** bulk materials handling system, built around aluminum containers plus filling and discharging equipment.

THE RESULT — A saving of approximately $100,000 in installation costs (as compared with silos and the necessary conveying equipment), plus greater flexibility.

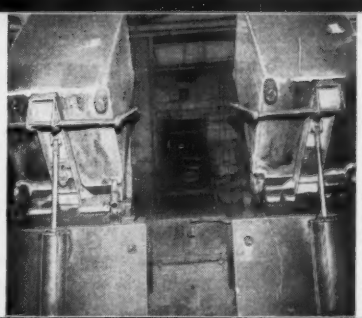
This shows, at right, the railroad hopper car unloading station at the Goodyear plant at Topeka. Three discharge ports at the bottom of the car feed a screw conveyor, which in turn feeds into the bucket elevator just to the left of the car. The elevator feeds a staggered screw conveyor (top of picture) which carries the carbon black into the plant.



This is where the carbon black is discharged into Tote containers (Type A92—92 cubic foot capacity) inside the plant. As the first container in the line is filled, the carbon black is carried over to the second container, and so on down the line until one compartment of the hopper car has been unloaded. A lift truck driver then removes the containers and replaces them with empties.



This is a portion of the warehouse storage space. Tote containers can be double-decked to conserve space.



This is a double Tote Tilt discharge station which feeds two Banburys. Each tilt discharges by gravity onto belt conveyors for delivery to the scale hoppers over the Banburys. The operation is entirely automatic. The operator sets the scale hopper dial for the amount of carbon black wanted, and the belt conveyor runs until the pre-determined amount has been delivered from the Tote containers.

*Tote and Tote System Reg. U S. Pat. Off.

Tote System engineers are available to help you determine the savings you can effect with this flexible, economical method of handling bulk materials. Write at once without obligation.

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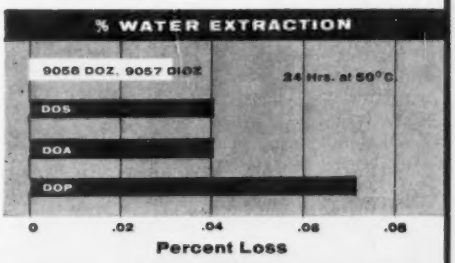
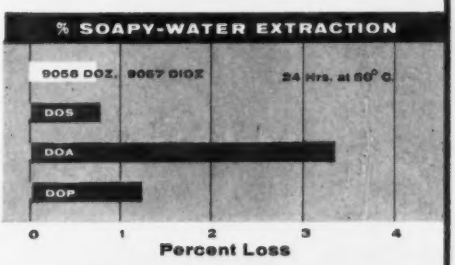
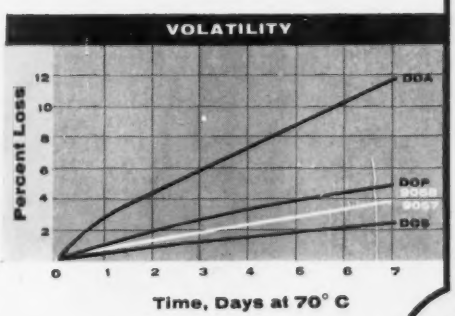
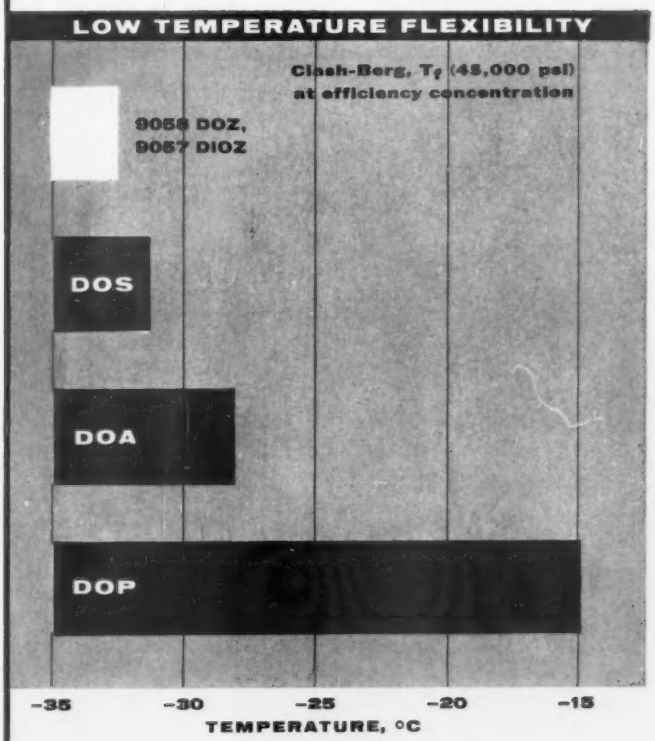
Here's proof that Plastolein® 9058 DOZ is the best all-around low-temperature plasticizer available!









When a plasticizer does *many* things well, it is reasonable to expect product improvement, lower costs and increased profits. That's exactly what happens when you use Plastolein 9058 DOZ or its companion product, Plastolein 9057 DIOZ. As the charts illustrate, both impart unexcelled low-temperature flexibility, *and at the same time* provide low volatility, low water extraction, and low soapy-water extraction. In addition, they possess excellent resistance to heat and light, provide low-viscosity dispersions, and impart excellent drape to film and sheeting.

When you put all of these features into your calendered and cast films, calendered sheeting, calendered and dispersion coated fabrics, fabricators of finished goods will be more receptive to your products, will reorder time after time. That's why you should use Plastoleins 9058 DOZ or 9057 DIOZ. Write Dept. U-10 for descriptive literature or evaluation samples, today.

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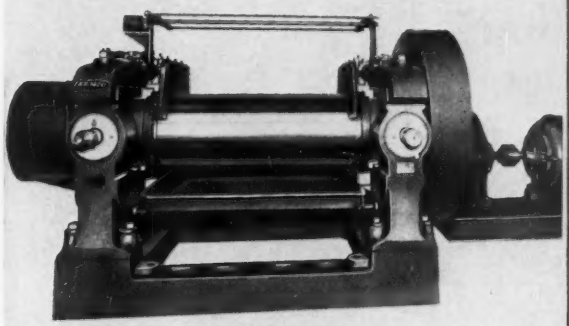

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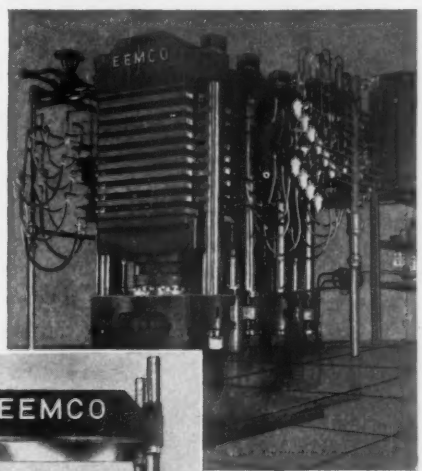
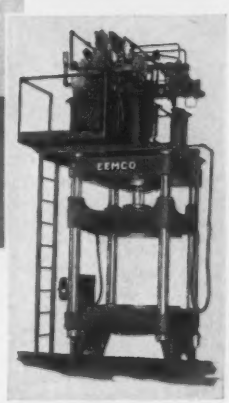
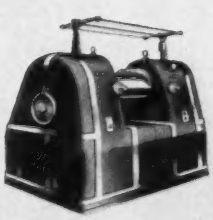
EEMCO heavy duty hydraulic presses are also available in a complete range of sizes from the 12" x 12" 42 ton laboratory press up to any size required. EEMCO designs and builds special presses to meet the customer's requirements.





EEMCO furnishes complete installations for reinforced plastics molding—presses, hydraulic units, preform machines, roving cutters and ovens.



Call or write us for complete details. We will be glad to discuss your "Mill and Press problems"—of course, at no obligation to yourself.

EEMCO ERIE ENGINE & MFG. CO.

12th STREET and EAST AVENUE • ERIE, PA.

MILLS • PRESSES • LOADERS • LIFT TABLES • PLATENS • PREFORM MACHINES • ROVING CUTTERS

especially for MOLDED rubber products

use MOCCASIN RECLAIM

Low Cost-Easy Processing
Good Mold Flow

TYPICAL FORMULATIONS

	A-485-8	A-485-4
MOCCASIN Reclaim	62.50	45.00
Brown Crepe	13.60	4.70
Mineral Rubber	—	13.00
Zinc Oxide	1.60	.60
Stearic Acid	.60	.20
Antioxidant	.40	.40
FEF Black	—	8.00
Soft Clay	—	10.50
Whiting	17.00	10.50
Process Oil	2.70	6.00
Benzothiazyl disulfide	.43	.37
DOTG	.14	.10
Sulfur	1.03	.63
	100.00	100.00
Estimated Lb. Cost	.1091	.0741
Specific Gravity	1.30	1.34
Volume Cost	.1418	.0993
Tensile p.s.i.	800	475
Elongation %	350	275
Durometer	50±5	70±5

Pequanoc's **"Moccasin"** is a clean-molding reclaim which makes an ideal combination between low cost and easy workability for economical molding. Since its introduction to the rubber industry, it has gained wide acceptance and broad usage so that today it forms an integral part of numerous industrial and consumer products.

Other applications for the use of **"Moccasin"** are continually being developed. Consider its use in **YOUR** product . . . as a low-cost, economical ingredient in your formula. Consult Pequanoc on your particular reclaim problem. Send today for a free sample of **"Moccasin"** and Pequanoc's latest Specification Sheets.

MOCCASIN A MODIFIED WHOLE TIRE STANDARD RECLAIM

Pequanoc Rubber Co.

MANUFACTURERS OF RECLAIMED RUBBER
MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

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SHARPLES ACCELERATOR 77-7

50% WATER DISPERSION OF
ZINC DIBUTYLDITHIOCARBAMATE

Use in latex for
FAST
low-temperature cures

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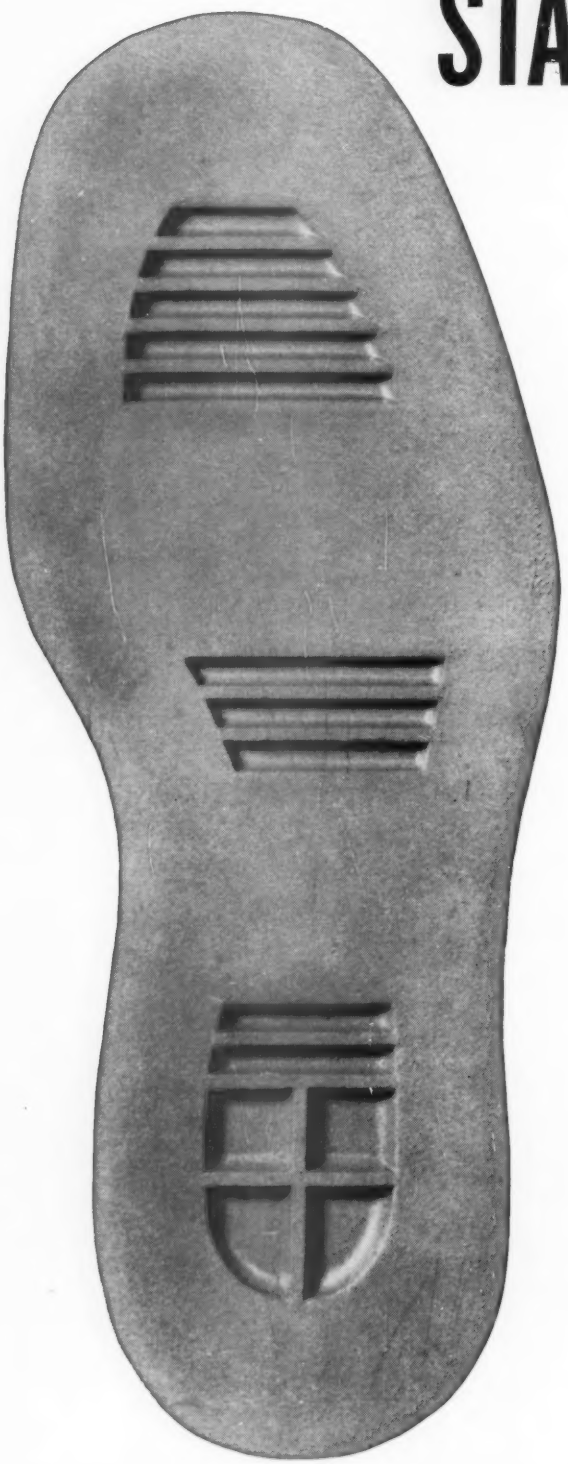
Pennsalt Chemicals

MILLIONS OF SOLES SAVED BY STAYBELITE® RESIN



Rejects are lost soles, but by providing better control over the production of conventional and expanded rubber soling, Hercules Staybelite Resin can help keep your reject ratio to a minimum.

Staybelite gives a stringy kind of tenacity to uncured and semi-cured rubber which provides improved control over processing. And its pigment dispersing ability means more starting points, more uniform cell structure, and more "blow" with a given amount of gas-producing material.

Staybelite's resistance to oxidation, its pale color, and lack of odor make it ideal as a processing aid for all types of soling and heels. In some cases, the presence of Staybelite in the formulation materially reduces objectionable odors caused by other necessary materials.

For information on the diversified uses of Staybelite Resin in rubber compounding, write for technical booklet.

Naval Stores Department
HERCULES POWDER COMPANY
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(CHEMICAL RUBBER)

for the ultimate in weather resistance

- *Bright and pastel* **HYPALON** *compositions will retain their color and elasticity after extended outdoor exposure. In fact, colors help by screening out ultraviolet rays.*
- *Carbon black is not necessary for good physical properties or for their retention after outdoor exposure.*
- *In contact with the weather,* **HYPALON** *compounds retain excellent abrasion resistance, flex life and strength over long periods of time.*

See Elastomers Division Report:

BL-274 "Colors for Du Pont HYPALON (Effect on Weathering)"

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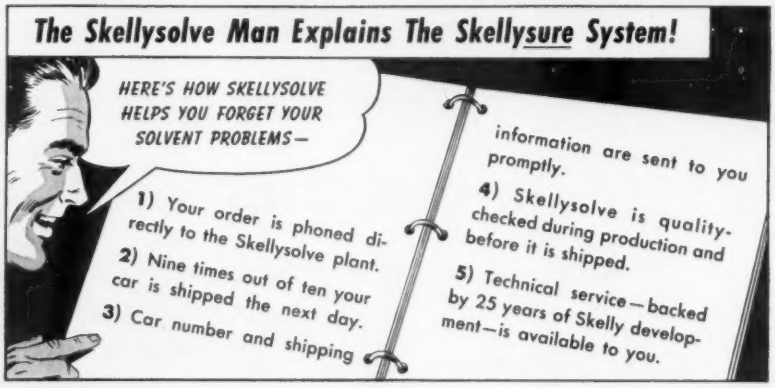
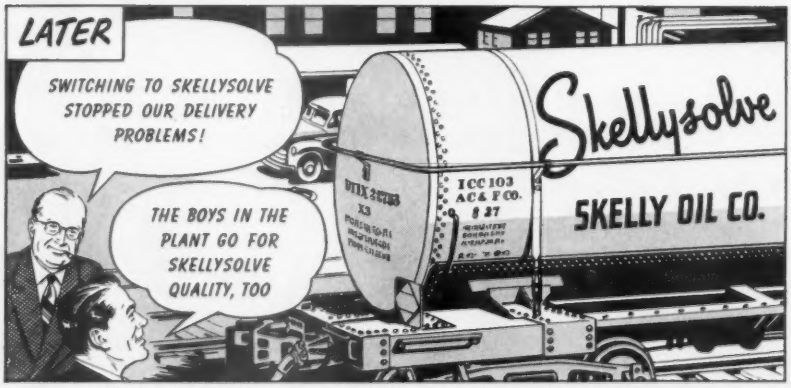
BUT BOSS— OUR SUPPLIER PROMISED...
THAT'S NOT ALL—THE QUALITY OF THAT LAST SHIPMENT JUST WASN'T UP TO PAR. IT'S COSTING US MONEY, SO DO SOMETHING!
CLICK!

The Skellysolve Man Explains The Skellysure System!


HERE'S HOW SKELLYSOLVE HELPS YOU FORGET YOUR SOLVENT PROBLEMS—
1) Your order is phoned directly to the Skellysolve plant.
2) Nine times out of ten your car is shipped the next day.
3) Car number and shipping information are sent to you promptly.
4) Skellysolve is quality-checked during production and before it is shipped.
5) Technical service—backed by 25 years of Skelly development—is available to you.


LATER
SWITCHING TO SKELLYSOLVE STOPPED OUR DELIVERY PROBLEMS!
THE BOYS IN THE PLANT GO FOR SKELLYSOLVE QUALITY, TOO
Skellysolve
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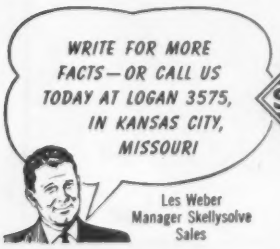
When solvents are so important to your business, why take chances on quality or delivery? Join the companies who are switching to Skellysolve.



Les Weber
Manager Skellysolve Sales

SKELLY **Skellysolve**

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Industrial Division
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Skellysolve for Rubber and Related Industries

Applications

SKELLYSOLVE-B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor in dried compound.

SKELLYSOLVE-C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve-B.

SKELLYSOLVE-D. For cements and variety of manufacturing operations. Good odor. Quick drying. Minimum of heavy, greasy compounds.

SKELLYSOLVE-H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve-D is desired.

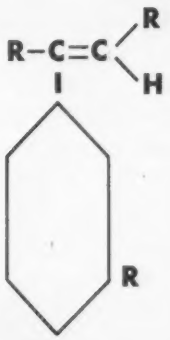
SKELLYSOLVE-E. For use wherever a relatively slow drying solvent is desired.

SKELLYSOLVE-R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency.

Thermoplastic

Pale Color

Elastic



Soluble

PICCOLASTIC RESINS

24 standard grades—polymers of styrene and its homologues

Piccolastic Resins are made in five series and twenty-four standard grades. They are polymers, in a wide range of average molecular weights, of styrene and its homologues.

They possess sufficient pale color so as to be suitable for the majority of uses. The entire line is soluble in aromatic hydrocarbons.

The Piccolastic Resins, with the exception of one type, are wholly hydrocarbon in structure, and therefore are alkali and acid resistant to a high degree, do not support mold or other fungus growth, and are not subject to enzyme reaction.

The Piccolastic Resins are permanently thermoplastic, and because of their heat stability at temperatures up to at least 175 C, make excellent stable, hot melt compounds.

Piccolastic Resins vary from viscous liquids through tacky solids, brittle solids to resins of hard horny toughness. Intermixtures of the various items permit an unlimited range of properties.

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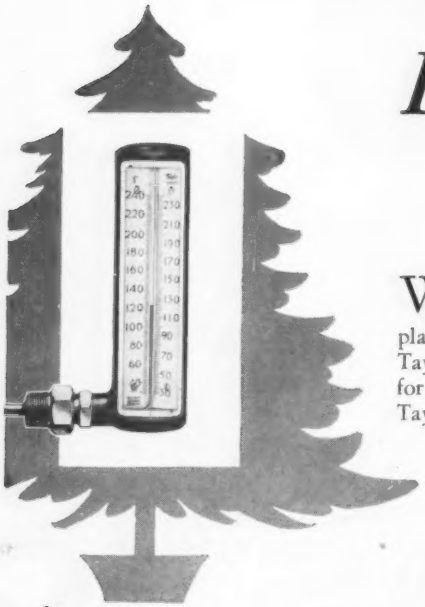
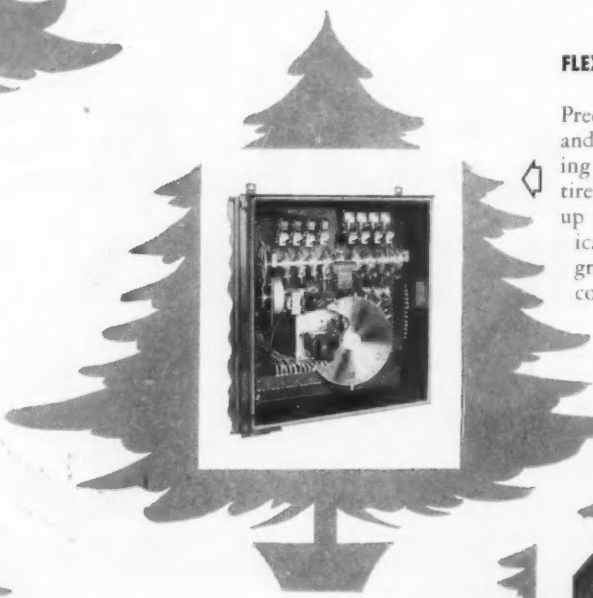
WHETHER your business is making tires, foam rubber or mechanical goods, you need complete control. And whether he's in control of a platen press or the company's finances, he'll welcome instrumentation by Taylor because it's accurate, dependable, and guards the company's reputation for uniformity of product quality. Call your Taylor Field Engineer, or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.



Taylor Industrial Thermometer
Ideal wherever an accurate check is needed on recording or controlling instruments. Available in many standard ranges and mounting angles. BINOC* tubing makes it 3-times-easier-to-read.



FLEX-O-TIMER* Timed Program Controller
Precisely times the sequence and operation of the processing cycles of platen presses or tire and tube presses. Handles up to 8 functions—automatically. Direct settings give greater accuracy, speed and convenience.

FULSCOPE* Recording Temperature Controller
Gives you close control of temperature. Easily adaptable to your processing requirements. Rugged, dependable—proven in the field for the past 16 years.

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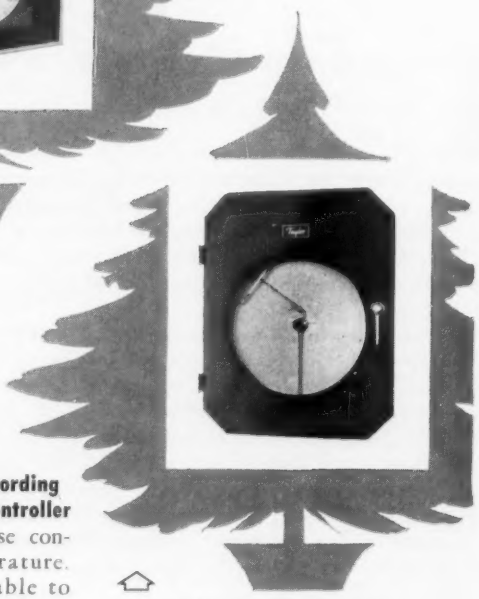

Taylor Pressure Recorder
Provides a continuous chart record of one to three related pressures. Provides a check on the efficiency of both operators and equipment for greater operating economy. Rugged, yet adaptable.

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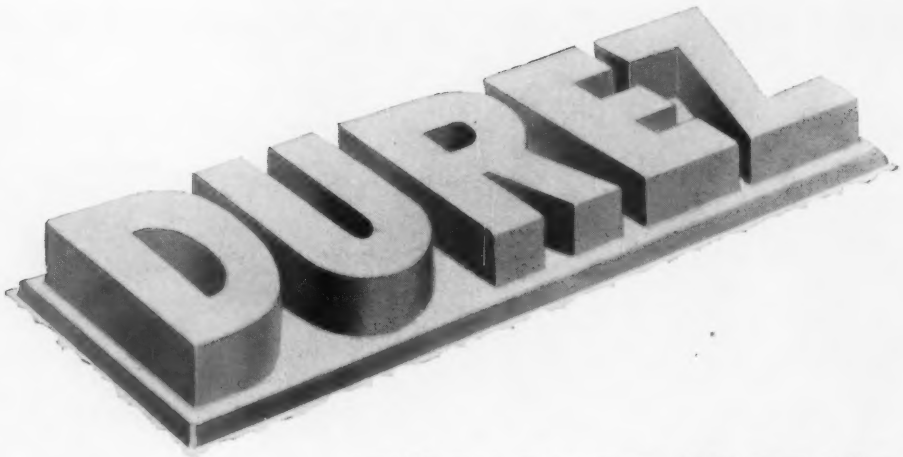

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IN HARD AND SEMI-HARD STOCKS	Special Durez phenolic resins are completely compatible with nitrile rubbers. Chemical reactivity causes vulcanization with greatly increased strength, hardness, stiffness, abrasion resistance, heat and chemical resistance. Our Durez resins have a plasticizing effect during processing. When set, they contribute to hardness, stiffness, and wear resistance in GRS stocks, and in blends of GRS and natural, straight natural, and Neoprene.
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YOURS FOR THE ASKING — we'll gladly furnish technical data and help you select the phenolic resin best suited to your needs. As a starter, let us send you our newest bulletin on Phenolic Resins in Rubber.

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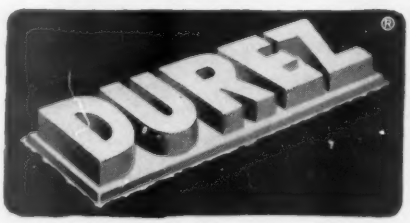
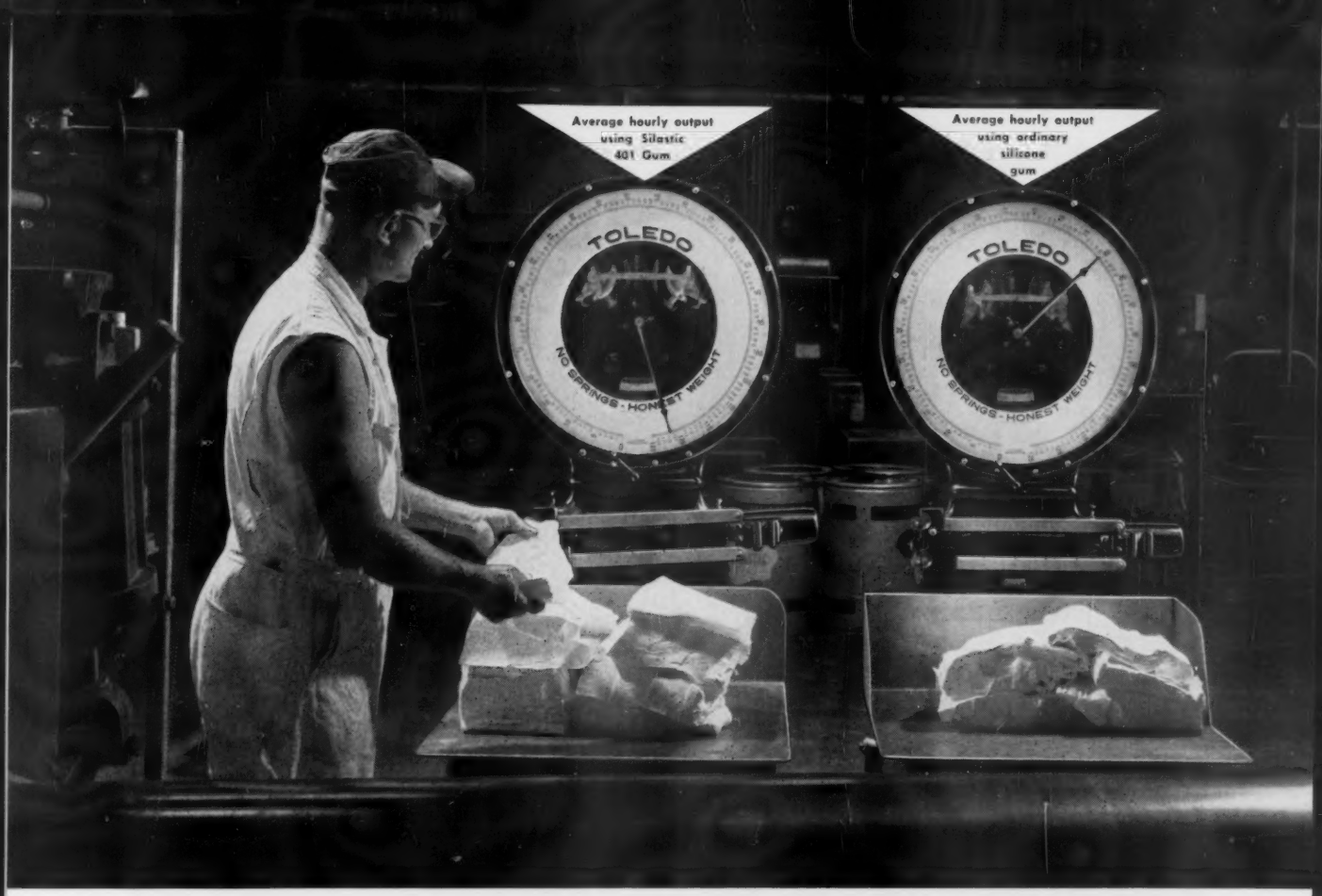
34 years of Leadership in Meeting Industry's Need for Phenolics



PHENOLIC RESINS
- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS


Average hourly output using Silastic 401 Gum
TOLEDO
NO SPRINGS - HONEST WEIGHT
Average hourly output using ordinary silicone gum
TOLEDO
NO SPRINGS - HONEST WEIGHT

SILASTIC 401 GUM

increases mill output 30%... reduces production costs!

Silastic 401 gum is easier to mill than other silicone rubber gums.* In actual production timing tests, a mill produced 122 pounds of stock per hour using Silastic 401 Gum versus 79 pounds using a conventional silicone gum. By reducing compounding time, *Silastic 401 Gum* assures more efficient use of your mills and saves capital investment in extra equipment. Furthermore, stocks compounded of *Silastic Gums* are exceptionally easy to mold and extrude. So, from every standpoint, *Silastic Gums* give you easier, faster processing and lower over-all production costs.

Remember, too — Dow Corning's 10 years of experience in compounding silicone rubber is at your service . . . either in the field or at Midland, Michigan, where you are invited to see for yourself the speed and results of compounding with *Silastic Gums.*

These Silastic PROPERTIES mean better products... *Low compression set without toxic additives. Serviceable at temperatures ranging from —100 F to 500 F. Withstands weathering, ozone, corona. An ideal dielectric material. Can be compounded for high tensile strength.*

Your source for all silicone RESEARCH materials... *Dow Corning offers the most complete line of silicone rubber gums to be found — sulphur vulcanizing, peroxide vulcanizing, and fluid types. They're always available in sample quantities . . . and new types are being developed constantly!*

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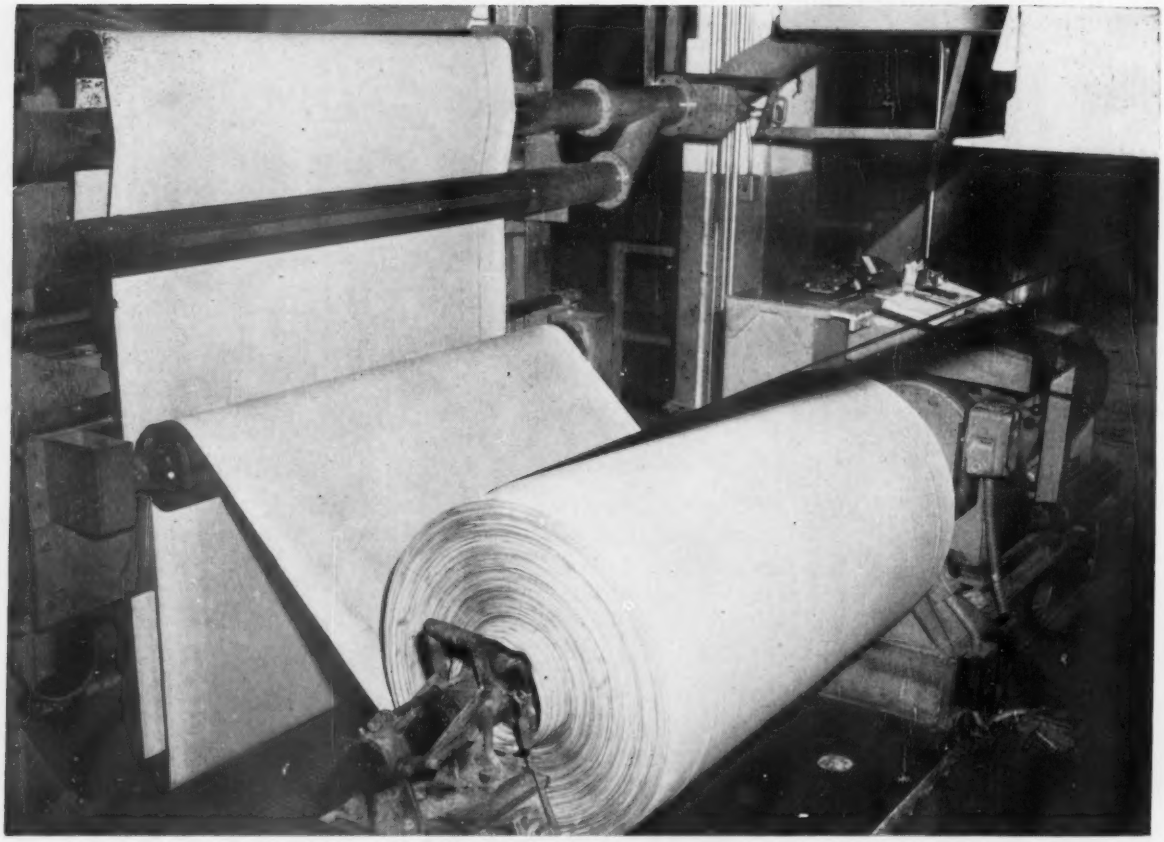

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Pay Off—In Any Width

Regardless of the width of your stock, roll it into a Climco Processed Liner when it leaves the calender. For handling any size stock, Climco Processed Liners pay off in faster, lower cost production.

Climco Processed Liners preserve tackiness, eliminate lint and ravelings. And new minimums are established for stock losses because gauge distortion is permanently eliminated. Climco Processed Liners help keep production going smoothly. Climco Processing—for more than 31 years giving the rubber industry a superior liner—is carefully applied by expert craftsmen using only proved ingredients. As a result, your liners last longer—years longer.

Try Climco Processed Liners in your plant. Find out why more and more companies in the rubber industry are standardizing on Climco.

THE CLEVELAND LINER & MFG. CO.
5508 Maurice Ave. • Cleveland 27, Ohio

GET THE FULL STORY ON CLIMCO PROCESSING

Illustrated booklet tells about Climco Liners and Linerette separating paper. Tells how to get better service from liners. Write for your copy now.

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Treatment Contains
NO OIL OR WAX
Samples on Request

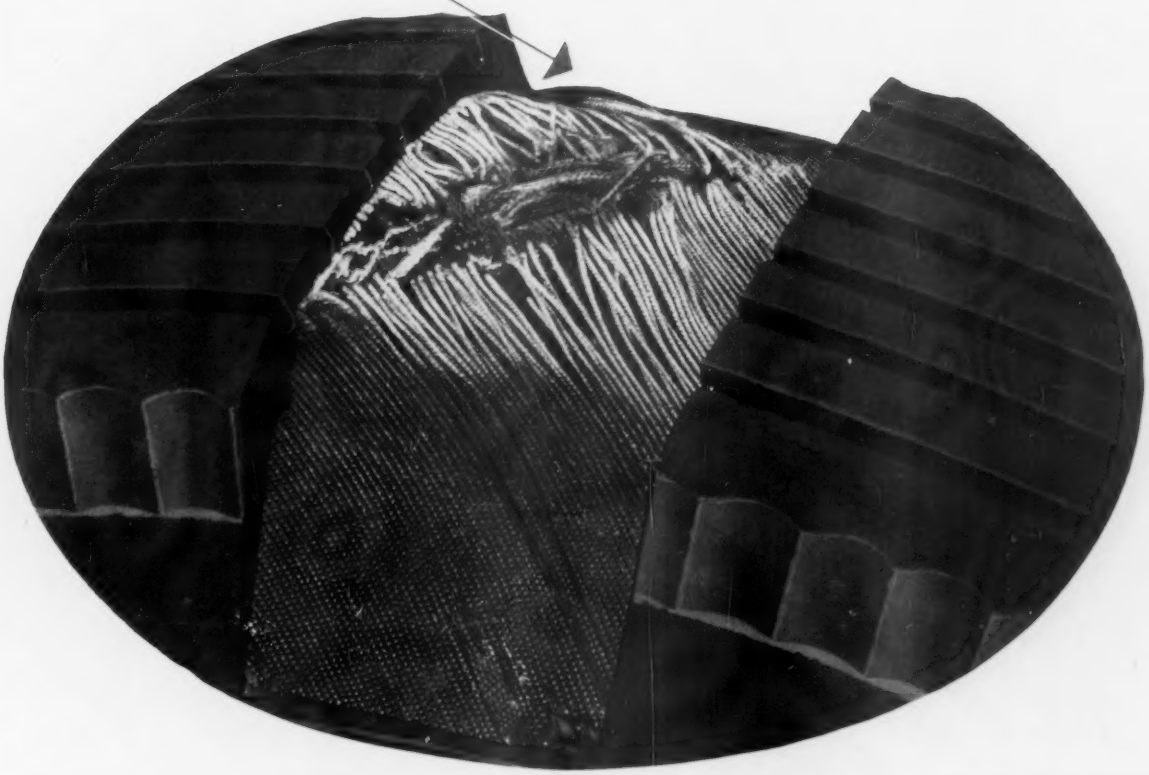
CLIMCO
PROCESSED LINERS

FOR FASTER, BETTER PRODUCTION AT LOWER COST

THE CLEVELAND LINER & MFG. CO. TRADE CLIMCO MARK CLEVELAND, OHIO, U.S.A.

ANOTHER QUALITY CHEMICAL BY GENERAL TIRE

This Can't Happen with GEN-TAC*



This looks like a bruise break but was caused by moisture entering a puncture. Gen-Tac (Vinyl Pyridine Latex) prevents such failures because its remarkable adhesion persists under the worst possible conditions. Gen-Tac can actually produce adhesion of rubber to Nylon that is greater than the strength of the cord itself.

For samples and reference data write to The General Tire & Rubber Company, Chemical Division, Akron, Ohio.

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Chemical Division GENERAL THE GENERAL TIRE & RUBBER CO.

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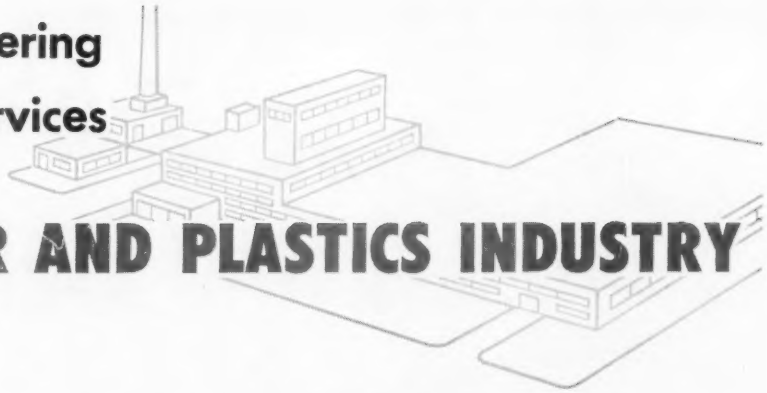
Creating Progress Through Chemistry

General Tire also produces . . .
Vygen* (Polyvinyl Chloride) • Gen-Flo* (Paint Latex) • Kure-Blend® (Masterbatch Accelerator) • Ko-Blend® (Insoluble Sulfur Masterbatch) • Glykon* (Polyester Resin) • Polystop® (GRS Shortstop)

complete engineering and planning services for the RUBBER AND PLASTICS INDUSTRY



- COMPLETE NEW PLANTS—from the selection of the site through all the many phases of engineering to produce an operating facility.
- PLANT MODERNIZATION—complete engineering to improve facilities in the shortest time, with the least disturbance to production.
- MATERIALS HANDLING—development and engineering of independent units or complete facilities.
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Giffels & Vallet INC.

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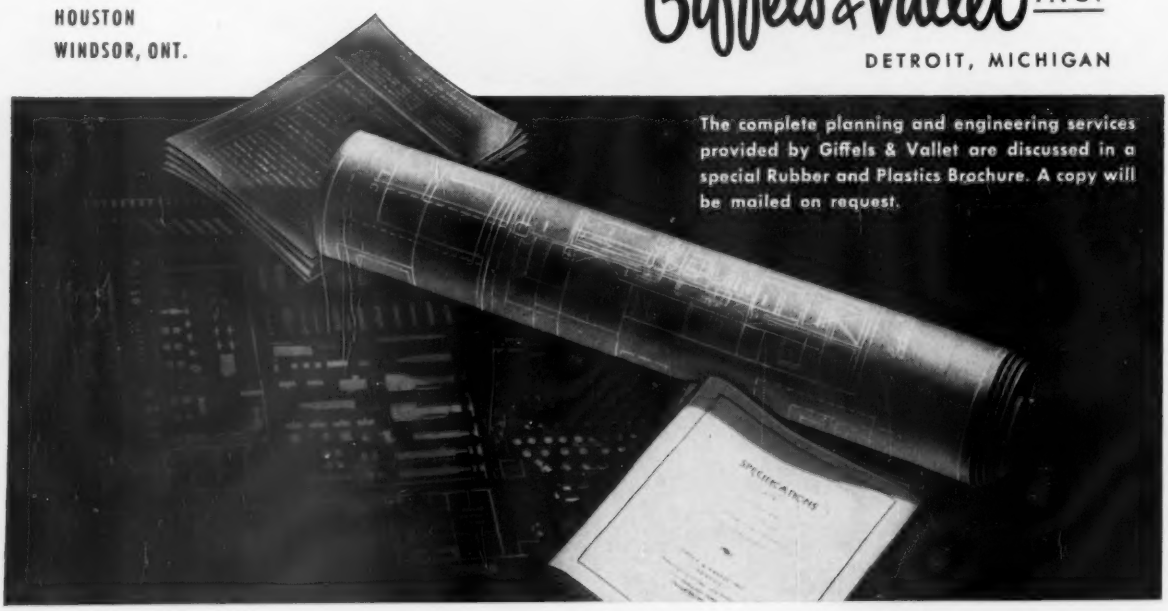
The complete planning and engineering services provided by Giffels & Vallet are discussed in a special Rubber and Plastics Brochure. A copy will be mailed on request.

SILENE®

...cheaper by the Uniboard

Columbia-Southern now uses a system of expendable "Uniboards" for shipping Silene. An increasing number of customers who have adopted the mechanized handling of raw materials have realized savings in handling costs through buying Silene on Uniboards. Instead of the time-consuming and laborious handling of individual bags, "cheaper by the Uniboard" is the watchword when a large quantity can be moved about as a single package.

Unloading is quicker, storage is better, there is reduced package breakage. When you buy Silene on Uniboards, cost savings to you are impressive.

Chisel-pointed, polished forks are required to handle Uniboards. If your present lift truck is not so equipped, the change can be made at moderate cost.

Uniboard loading is available upon request at no increased cost to Silene EF and Calcene customers.

While it is recognized that each plant has its individual problem on material handling, the Columbia-Southern Uniboard system is flexible enough to suit all cases. We will be happy to discuss proposed loading methods and other aspects with your personnel. Write today to Rubber Pigments Department at our Pittsburgh address.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
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everybody talks

QUALITY

these pure light red iron oxides

by WILLIAMS assure it!

R-1599 | R-2199 | R-2899

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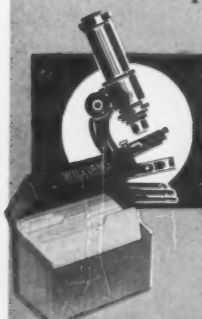
Williams iron oxides come to you with all the benefits of our 75 years in the pigment business . . . and as a result of our experience in producing pure red iron oxides to specifications of the leading rubber companies.

Each is manufactured to rigid specifications for copper and manganese content, pH value, soluble salts, fineness, color, tint and strength by controlled processes and with special equipment. *The result is absolute uniformity of product.*

If you haven't already done so, try these finest of all iron oxide colors. Your own tests will show there is no equal for Williams experience.



LET WILLIAMS PUT THE MICROSCOPE ON *Your* COLOR PROBLEM

Whatever your color problem, bring it to Williams. Our 75-year experience can often save you time, money, and headaches in proper color formulation.

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COLORS & PIGMENTS

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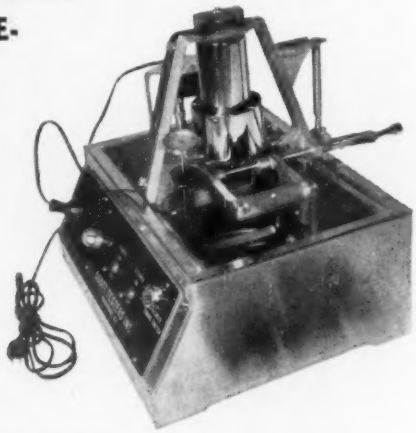
SCOTT RUBBER TESTING EQUIPMENT

MODEL E

BRITTLE-POINT

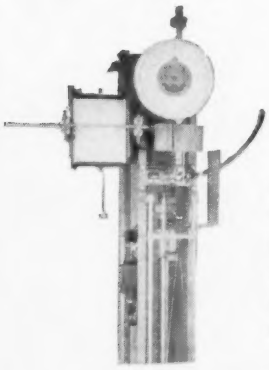


As low as —120°C.

This brittle-point tester with a range of +50° to —120°C, is acclaimed as the Industry standard for brittleness determination of rubber, elastomers and plastics, as indicated by the volume purchased.

ORR-L5

The most advanced design of PENDULUM WEIGHING SYSTEM



The most precise tensile tester for rubber, it compensates in both directions on the restricted area of a dumbell specimen for increased accuracy of test value.

Literature upon Request

SCOTT TESTERS, INC.

85 Blackstone St., Providence, R. I.

Standard of the World

If you process Rubber...

Commercially accepted...

A-C POLYETHYLENE can help you! This low molecular weight polymer is now commercially accepted for a number of processing jobs. And it is currently being examined as a modifier for all types of natural and synthetic rubber.

Important new technical data now available!

It might pay you to evaluate this versatile material in your plant right away. This may lead to better processing methods or entirely new products.

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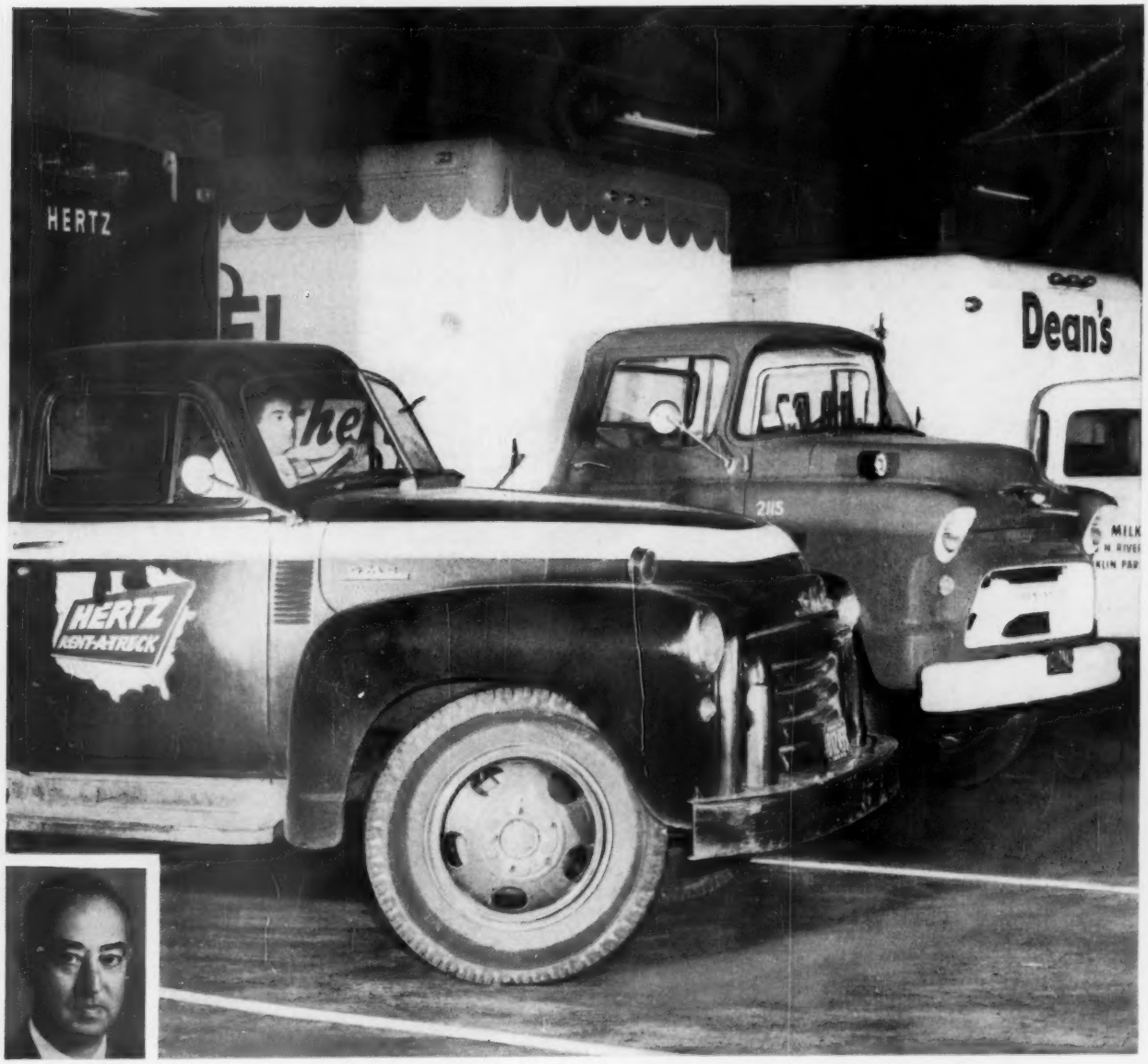


Walter L. Jacobs,
President, The Hertz Corporation

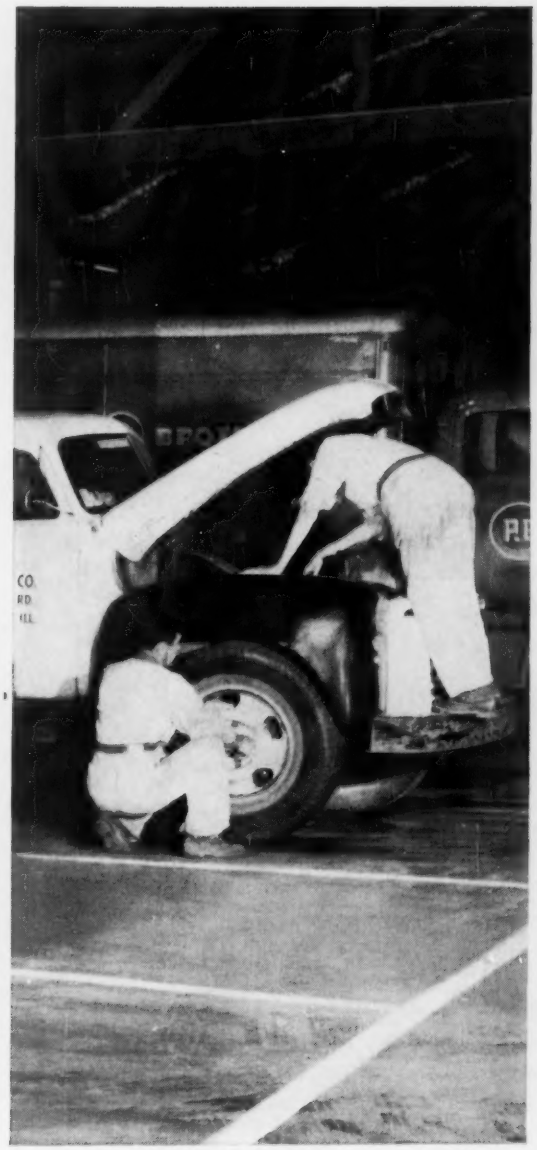
The Hertz Garage in Chicago, where trucks are serviced for many midwestern customers.

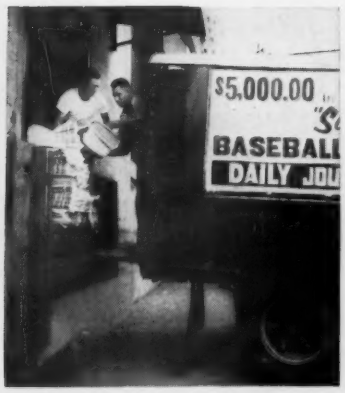
HERTZ, world's largest rental fleet proves

RAYON CORD

Walter L. Jacobs, President of The Hertz Corporation, says—"Ours is probably the most diversified trucking operation in the world. As a truck rental company, we must meet the separate needs of a variety of customers in all types of industries. And we have found from experience that trucks equipped with RAYON CORD TIRES are ideally suited to do a better job in any given situation. That's because Rayon Cord Tires stand up better, even under the roughest of driving conditions.

"We estimate that our 15,750 trucks will run up a total of 200,000,000 miles this year—and all but a small percentage will be covered by rugged Rayon Cord Tires! Because our customers put our trucks to almost every kind of use imaginable, we must be sure our tires will stand up under all kinds of road and load conditions. That's why we use Rayon Cord Tires. They can take it!"





THE NEWS GETS THERE ON TIME. "Some of our biggest customers in New York are the newspapers. It's a newspaper's job to get the news to the public—fast. Newspapers aren't in the trucking business, and we relieve them of all the "headaches" they would otherwise have by supplying them with trucks on long-term leases. Our own "headaches" are considerably lessened, thanks to Rayon Cord Tires. Their long-lasting strength keeps maintenance costs down—and as all truckers know—that's where profits lie."

MILK FOR BREAKFAST EVERY MORNING. "Dairies are among the biggest users of our trucks in the Chicago area. Theirs is the toughest kind of driving there is—stop-and-go, in-city driving and on back roads. That means extra punishment on tires. But rugged Rayon Cord holds up and makes sure that the milk children need is delivered. We find that Rayon plus our systematic tire checking program pays off in less failures—and thereby keeps down-time loss at a minimum."

FROM CHICAGO'S STOCKYARDS TO THE NATION'S DINNER TABLES. "Meatpackers are heavy users of our refrigerated trucks. They travel cross country on modern turnpikes at high speeds. Here again Rayon's safety and strength pay off. Rayon pays off in other ways, too. It gives us more recaps per tire and allows us to keep spare tire inventories low. In our entire organization, in 650 cities from coast to coast, we average two and a half recaps per tire. For this reason we are able to keep inventories down to under 5%."

TIRES PAY OFF!

Truckers say that tires made of Rayon Cord are better for any and all kinds of trucking. Records show that more truckers use RAYON CORD TIRES than any other. They can rely on Rayon because Rayon pays off!

AMERICAN RAYON INSTITUTE INC.

350 Fifth Avenue,
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The Best Method Yet Devised . . .

FOR DICING SHEET STOCK

The Famous CUMBERLAND "Stair-Step" Dicer

Here at last is the answer to your problems of dicing rubber or vinyl sheet stock. Produces perfect cubes ranging in size from ⅛ to ½" by merely changing knives.

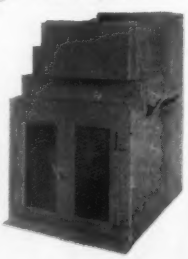
Comes in two sizes designed to handle sheets up to 7" or 14" in width. Other sizes made to order.

Input speeds range from 10 to 125 feet per min. depending on material and size of cube desired.

The CUMBERLAND Rotary Chopping and Dicing Machine

As a chopper, this machine efficiently cuts rubber and vinyl slabs into small pieces. Two sizes available to handle stock widths up to 14 or 24 inches.

As a dicer in modified form, handles principally vinyl sheet stock. A less expensive machine though less universal than the "Stair-Step" Dicer shown above.



For Granulating Plastic . . .
Investigate Cumberland's complete line of granulating machines. Request Bulletin 260.

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Builders of Better Machines for the Rubber and Plastics Industry

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Serving You Better
WITH OUR MODERN RECLAIMATOR PLANT

Here you'll find the industry's most modern plant coupled with its most modern process. Reclaims made by our patented, continuous-flow **Reclaimator Process** are available in all Standard Grades . . . powdered, extruded slabs, or sheeted slabs.

The addition of the **Reclaimator Process** to our standard pan and digester methods affords the industry the widest selection of reclaims FOR EVERY PURPOSE.

72 years serving the industry, solely as reclaimers.

U.S. RUBBER RECLAIMING COMPANY, INC.
BOX 341 · BUFFALO 5 · NEW YORK

Rubber Epicure?

—here's a recipe that will delight you!

SLAB SOLE COMPOUND

	Parts by Weight
GR-S, 1006	90
High Styrene Resin	10
NEVILLE LX-685, 135	12
Antioxidant	1
Calcium Silicate	50
Hard Clay	200
Zinc Oxide	5
Process Oil	5
Mold Lubricant	2.5
Stearic Acid	1.5
Benzothiazyl Disulfide	1.5
Zinc Dimethyl Dithiocarbamate	0.5
Rubbermakers Sulfur	4
Total	**383.0**

For extremely high hardness, approximately 5 parts of phenolic resin may be added

Cure: 6 minutes at 310°F.
Specific Gravity: 1.66
Hardness, Shore A: 96
Color: Light Brown
Mold Release: Good
Hot Tear Resistance: Good
Cost per pound (estimated): $.092

To Satisfy Your Epicurean Taste for

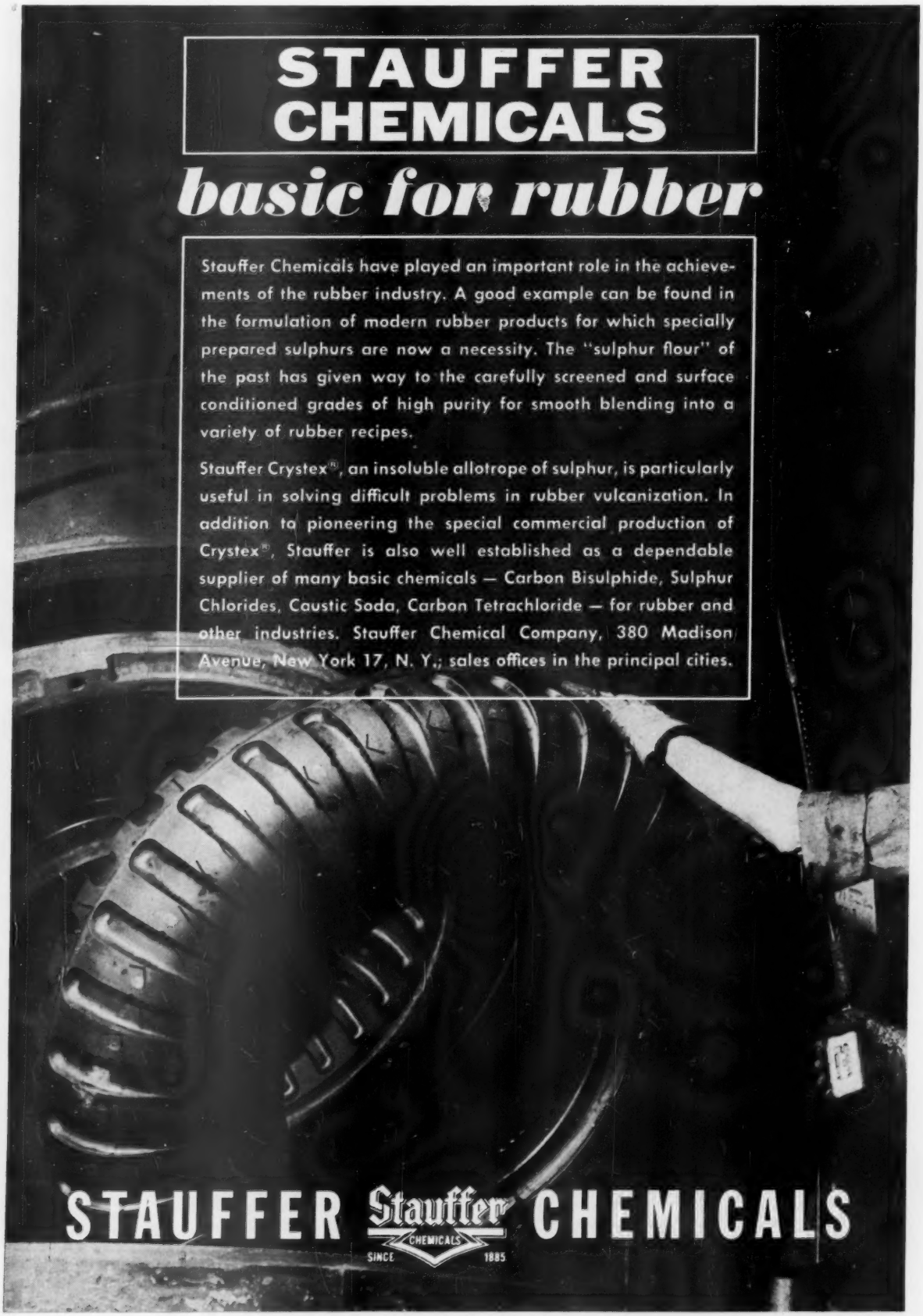
EASE OF PROCESSING
HIGH HARDNESS
ABRASION RESISTANCE

at low cost specify
NEVILLE LX-685,135

NEVILLE CHEMICAL CO.
PITTSBURGH 25, PA.
Plants at Neville Island, Pa., and Anaheim, Cal.

R-56

NEVILLE


STAUFFER
CHEMICALS
basic for rubber
Stauffer Chemicals have played an important role in the achievements of the rubber industry. A good example can be found in the formulation of modern rubber products for which specially prepared sulphurs are now a necessity. The "sulphur flour" of the past has given way to the carefully screened and surface conditioned grades of high purity for smooth blending into a variety of rubber recipes.
Stauffer Crystex®, an insoluble allotrope of sulphur, is particularly useful in solving difficult problems in rubber vulcanization. In addition to pioneering the special commercial production of Crystex®, Stauffer is also well established as a dependable supplier of many basic chemicals — Carbon Bisulphide, Sulphur Chlorides, Caustic Soda, Carbon Tetrachloride — for rubber and other industries. Stauffer Chemical Company, 380 Madison Avenue, New York 17, N. Y.; sales offices in the principal cities.
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CHEMICALS
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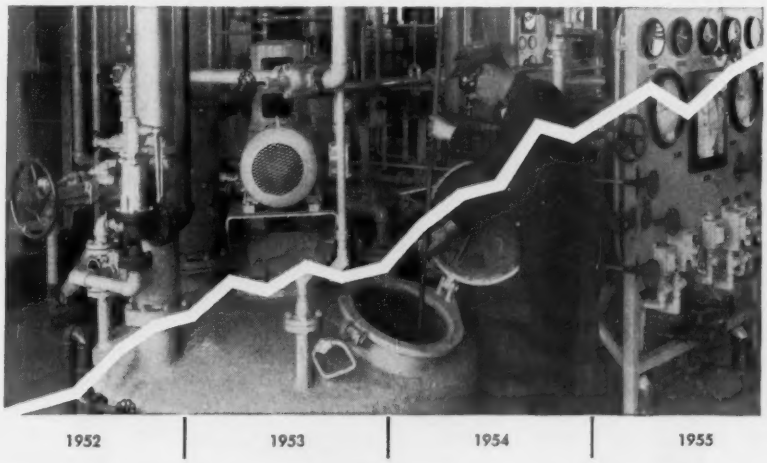


The mounting demand for Cyanamid's delayed-action accelerators is reflected in the consumption chart superimposed on the above photograph, which shows the extraction of a sample of NOBS Accelerator for a quality-control check.

Furnace Blacks Effect Major Change in Tire Processing

With the growing use of furnace blacks in automobile tire compounding, a major change in formulations has been necessary. Where formerly channel blacks worked well with thiazole-type accelerators, furnace blacks required something new—a delayed-action accelerator that would prevent scorching, premature cure and other processing difficulties.

To answer this problem, Cyanamid's Research Laboratories at Stamford, Conn., developed two products, NOBS* No. 1 and NOBS* SPECIAL delayed-action accelerators. Both have proved so successful in use that they have set standards of performance which many manufacturers now use as guides for measuring safe processing time. In addition, their acceptance has been so rapid that production capacity at Bound Brook has been expanded several times to meet demand.

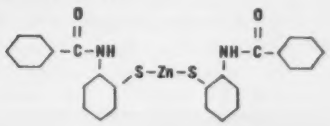
Reinforcing furnace blacks create higher processing temperatures and their alkalinity prematurely activates the thiazole-type accelerator. In mixing and processing, formulations containing delayed-action accelerators, such as NOBS No. 1 provide sufficient safe handling time to overcome the inherent scorching tendencies of furnace blacks.

The delayed action of NOBS No. 1 and NOBS SPECIAL Accelerators enables rubber manufacturers to reduce losses on scorched stock, allows increased extruding speeds and improves mixed stocks storage stability. During the first minutes of the cure improved mold-flow completely fills out the design, reducing tendency for surface blemishes.

*Trade-mark

A New Low-Temperature Peptizer

An excellent chemical peptizer for low-temperature mastication of natural rubber is Pepton® 65 Plasticizer, newest addition to Cyanamid's growing line of rubber chemicals. Its chemical structure is:

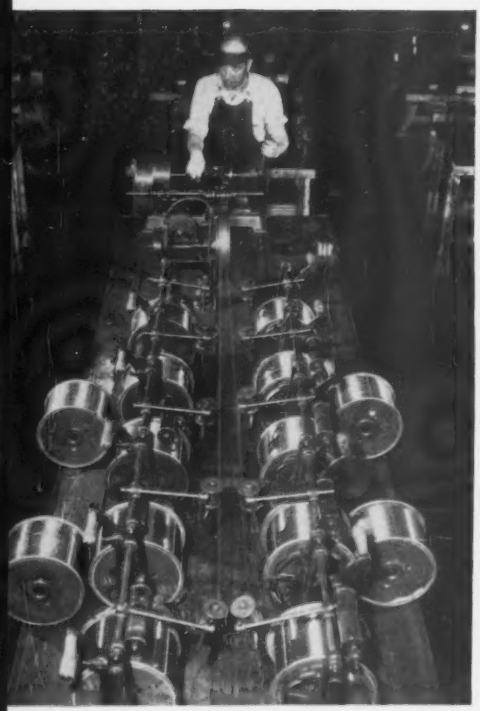


Zinc 2-Benzamidothiophenate

Extensive laboratory tests and factory evaluation have established that the use of small quantities of Pepton 65 will allow a reduction of as much as 30% in milling cycle and will impart good plasticity to masticated rubber. Reports further show that the milling cycle can be held constant and the Mooney viscosity of the rubber substantially reduced. This first advantage is of special interest to companies which are limited in their milling and mixing capacity. The second is especially welcome in factories processing soft rubber for products such as blown sponge.

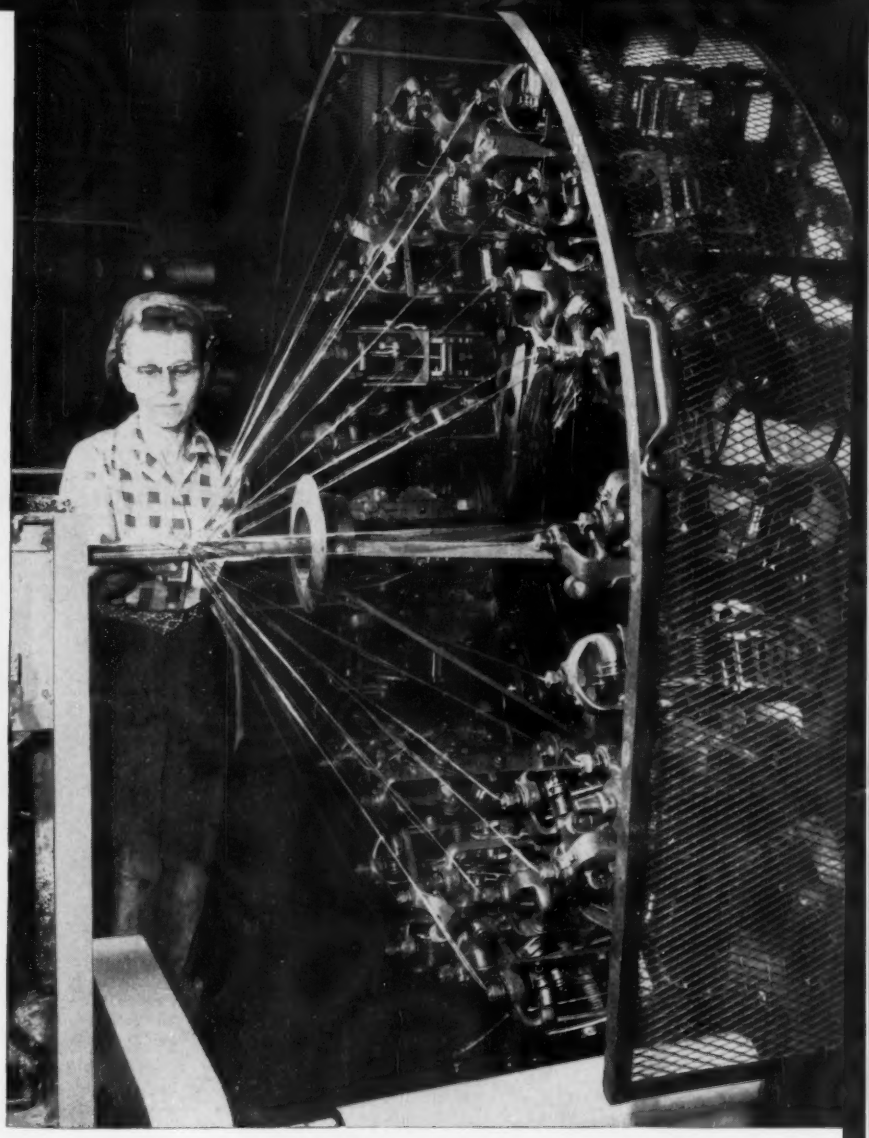
Pepton 65 shows promise as an additive in the initial stages of direct mix Banbury batches. Its activity at low temperatures gives catalytic aid to the rubber mastication immediately, instead of requiring activation by the higher temperatures reached during Banbury mixing.

Inquiries about this new product are invited, and a trial sample will be forwarded promptly on request.



1. Fine Steel Wire furnished on 65 lb. spools, is rewound into multiple wire strands. It is extra straight for smooth spooling.

2. The Number of Wires in a multiple is determined by the design of the hose it is to reinforce. These wires have tensile strengths of up to 400,000 psi.



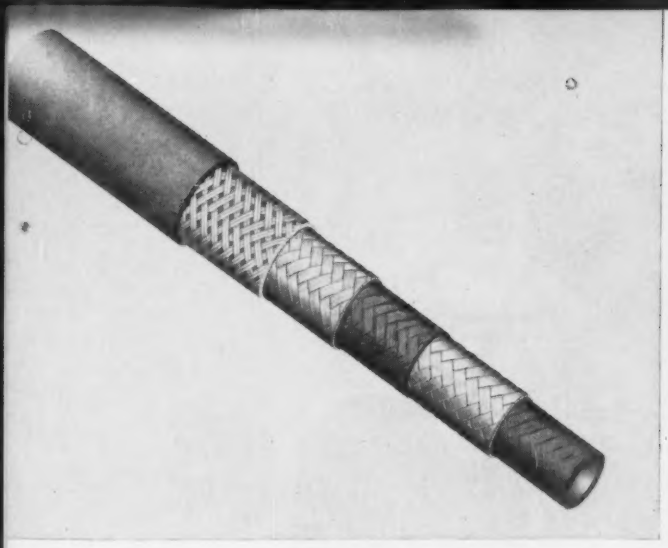
3. Multiple Strands are braided around the tube or core of the hose under constant tension in this planetary braider. Wires are uniformly sound to avoid breakage. Bright golden liquor finish on the wires makes the bonding cement applied later adhere to them.

How Fine Steel Threads Give Strength To Rubber Hose

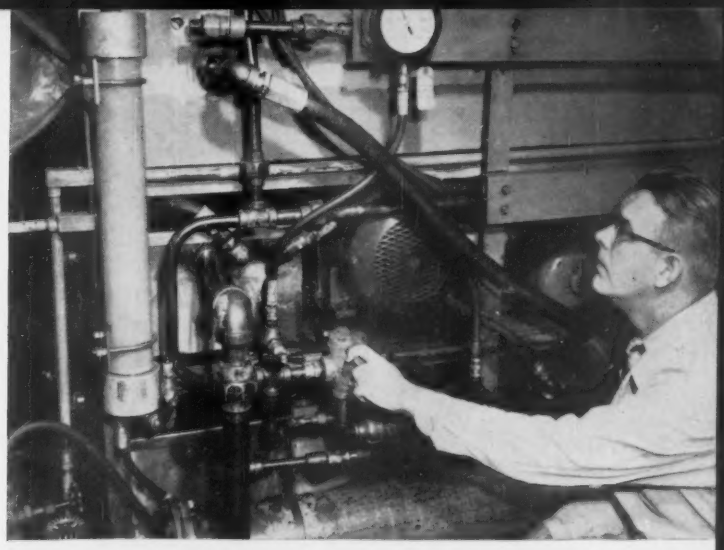
Concealed inside a rubber covered flexible hydraulic hose is the story of how special quality steel threads, woven into intricate sinews, help control and resist tremendous internal pressures.

Such hydraulic hose is used to transmit power on an ever-widening variety of machinery and equipment ranging from hydraulic presses, power feeds on machine tools, die sinking and forming presses, multiple die-casting equipment—to aircraft controls, farm and road building equipment, trucks—even the high-pressure greasing equipment in your neighborhood gas station.

B. F. Goodrich Company, for example, produces hundreds of miles of this hose every year in a variety of more than 150 types, and in a range of diameters and constructions that will carry working pressure up to 9,000 pounds per square inch.



4. Rubber-Covered hydraulic hose has an intricate inside construction. Braiding wire is sheathed in alternate layers of textile braid and rubber to prevent friction and maintain flexibility. When man-made rubber cement is added, it fills all the interstices, bonding and sealing the hose to contain tremendous pressures.



5. Uses of Hydraulic Hose are ever-increasing as they are a vital element in development of advanced machinery and automatic controls.

The ability of hydraulic hose to contain these enormous pressures comes from braids of fine steel wire woven into its construction. It is a special wire with tensile strengths ranging from 240,000 to 400,000 pounds per square inch such as that produced by Johnson Steel & Wire Company.

• **How It Is Made**—Watching low pressure (2,500 psi) hose produced at B. F. Goodrich, for example, you see Johnson wire arriving on spools. These spools are placed on rewinding machines (photo No. 1). The wires are rewound onto a spindle in flat strands that are several wires wide (photo No. 2), depending upon the design of the hose they are to reinforce.

Spools holding the strands are placed on planetary braiding machines (photo No. 3) that can hold from 16 to 64 spools. The number used depends upon the diameter and capacity of the hose.

As the braider revolves, the strands under constant controlled tension feed onto the basic fabric of the hose which moves through the center of the machine. Each hose is constructed of wire strands and textile braids insulated by rubber to cushion, bond, and support the wire braid—serves as an anti-friction agent and gives supple flexibility (photo No. 4).

Man-made rubber cement is added to bond and seal the construction, filling all the interstices between braids. Finally a rubber coating is applied to protect the steel and cotton fabric. It is tested at twice the recommended working pressure.

• **Strong Sinews**—Obviously the wire made by Johnson Steel & Wire for reinforcing hose is something out of the ordinary. It is drawn from selected high carbon steel in diameters ranging from .008″ to .016″ and has exceptional dimensional accuracy—a tolerance of plus or minus .0005″.

It is supplied with a special golden liquor finish which provides an adhering surface for the bonding cement. This wire is very straight to make possible even spooling and has uniform tensile strength to prevent it breaking under the working tension.

This wire helps assure smooth, economical operation of the precision process of reinforcing hose which is why such producers as B. F. Goodrich and other leaders know Johnson as a dependable source of supply for hose reinforcing wire and other special wires used in many of their products.

In fact, many industries draw upon Johnson's vast experience in producing a wide range of fine specialty wire for aircraft cord, armature binding, belt lacers, bobby pins, brushes, gutterbrooms, textile machinery, shade rollers, flexible shafts, mandolins, pianos, wire rope, safety pins, staples, metal stitching, tire beads, MB hard drawn and oil tempered spring wire and music spring wire.

These specialties are helping many manufacturers speed production, improve their products with economy. Perhaps you too can benefit. Call the nearest district office for prompt personal service.

Johnson Steel & Wire Company, Inc.

Worcester, Massachusetts

Everything New But the Name

***a subsidiary of* Pittsburgh Steel Company**

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DISTRICT SALES OFFICES: Akron • Atlanta • Chicago • Cleveland • Columbus • Dallas • Dayton • Detroit • Houston • Los Angeles New York • Philadelphia • Pittsburgh • San Francisco • Tulsa • Warren, Ohio. **PLANTS:** Monessen, Pa. • Allenport, Pa. Akron • Los Angeles Warren, Ohio • Worcester, Mass.

all in partnership with rubber...

but no two wires alike!

● Pictured above are four typical examples of the many special-purpose wires developed by National-Standard for wire-in-rubber products.

They do have one essential quality in common —a highly developed affinity for adhesion with rubber. But beyond that, each has a different job to do . . . and is painstakingly engineered to do it . . . effectively!

For years National-Standard has specialized in improving the behavior of wire in rubber—digging into all the intricacies of application, fabrication, finish, corrosion, strength, elongation, adhesion and innumerable details you might never bother with.

Main reason for all this research, this "groundwork", is to help you improve your products, increase production, conserve materials and cut costs! Perhaps you now face *new* defense production problems involving wire. Remember, National-Standard service is always at *your* service.

NS
NATIONAL-STANDARD
Company
NILES, MICHIGAN

DIVISIONS OF NATIONAL-STANDARD CO.

ATHENIA STEEL	*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD	*Niles, Mich.*	Tire Wire, Stainless, Fabricated Braids and Tape
REYNOLDS WIRE	*Dixon, Illinois*	Industrial Wire Cloth
WAGNER LITHO MACHINERY	*Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS	*Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes

Developed by Cabot laboratories...
Now being manufactured commercially...

A SINGLE COMPOUND MADE with BOTH

Cabflex® DDP and Cabflex® TCP

di-decyl phthalate — *tricresyl phosphate*

Approved by Underwriters' Laboratories, Inc.
for both

80° and 90° WIRE VINYL INSULATION

Mixed tank truck and tank car quantities
of both plasticizers immediately available

Insulation Resistance —
Megohms — 1,000 Ft.

@ 15.6° C.	2580.0
@ 50.0° C.	17.9
@ 60.0° C.	7.8
@ 75.0° C.	1.7

Low Temperature Properties*

Passed	−20.0° F.
Failed	−30.0° F.

Retention of Elongation

60 days @ 97° C.	85%

Pound Volume Cost** 40.0¢

All tests run on #18 wire, 1/32" wall thickness
** Bent around 0.113" mandrel*
*** Based on current list prices of raw materials*

MANUFACTURER'S COMPOUND

	Parts
VINYL RESIN (electrical grade)	100
CABFLEX® DDP	38
CABFLEX® TCP	20

For samples and further information address

CABOT PLASTICS CHEMICALS DIVISION

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CABFLEX®Di-OP (di-iso-octyl phthalate)
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CABFLEX®ODP (iso-octyl decyl phthalate)
CABFLEX®DDP (di-decyl phthalate)

CABFLEX Di-OA® (di-iso-octyl adipate)
CABFLEX®DOA (di-2-ethylhexyl adipate)
CABFLEX®ODA (iso-octyl decyl adipate)
CABFLEX®DDA (di-decyl adipate)

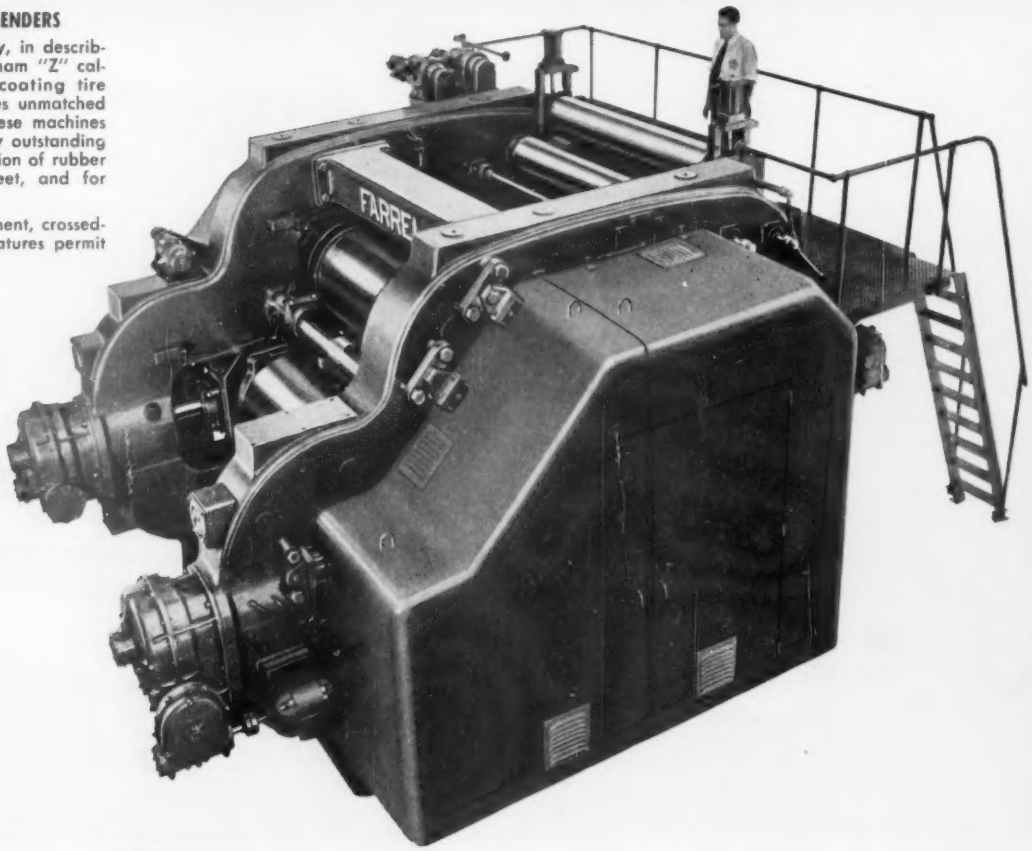
CABFLEX®Di-OZ (di-iso-octyl azelate)
CABFLEX Di-BA®(di-iso-butyl adipate)
CABFLEX®TCP (tricresyl phosphate)
CABOL®100 (hydrocarbon oil plasticizer)

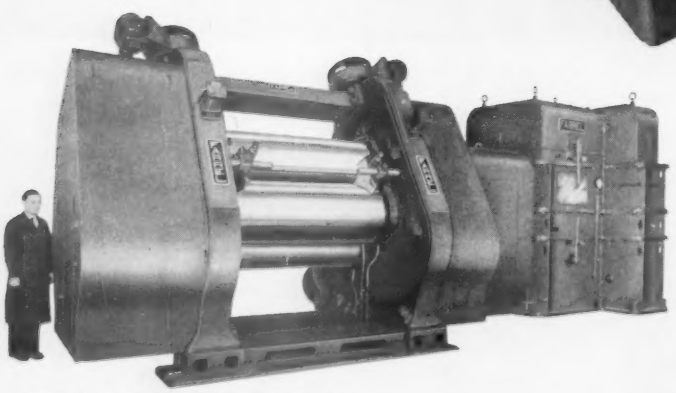
Bring your Calendering Problems to FARREL-BIRMINGHAM®...

FOUR-ROLL "Z" CALENDERS

A leading rubber company, in describing its new Farrel-Birmingham "Z" calender train for double-coating tire fabric, says that it "insures unmatched uniformity of quality". These machines have proved to be equally outstanding for the high-speed production of rubber and plastic film and sheet, and for single coating.

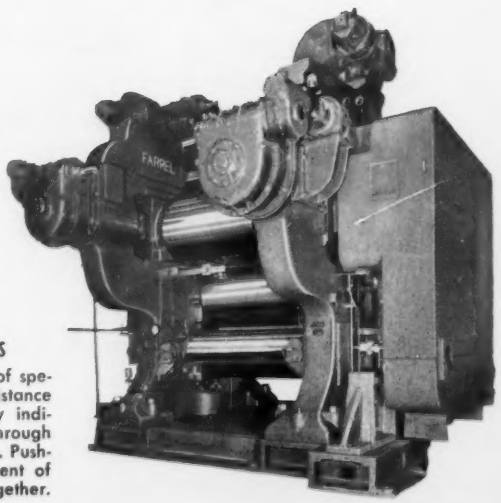
Their unique roll arrangement, crossed-axes device and other features permit full control of gauge.





THREE-ROLL TRI-ANGULAR CALENDERS

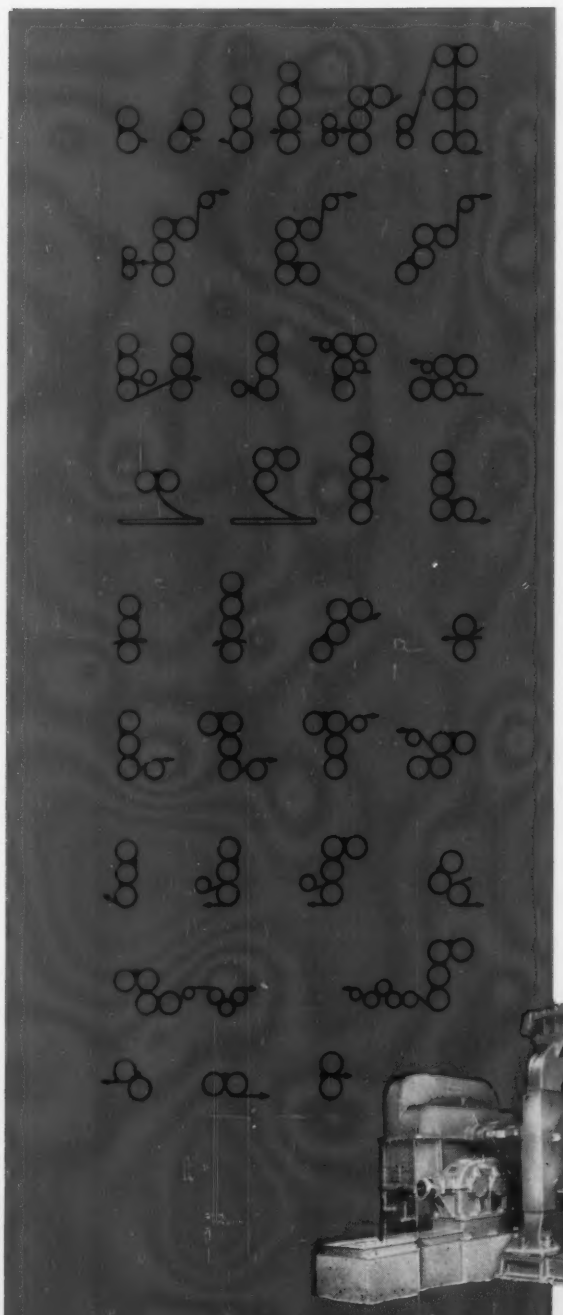
The machine of the future for any type of production requiring two calendering passes. Right-angle arrangement of rolls provides closer control of gauge and easier feeding conditions.



FOUR-ROLL L-TYPE CALENDERS

This 28" x 66" plastics calender is of specially heavy construction for high resistance to deflection. Roll adjustment is by individual motor driving each screw through high-ratio reduction worm gear units. Push-button control provides for adjustment of either roll end separately or both together.

. ."Calender Headquarters" since 1854



Since that time, a century ago, Farrel-Birmingham has maintained world-wide leadership in calender design and pioneered many improvements.

Of particular importance are the two most recent developments —the four-roll "Z" calender and the three-roll "Tri-angular" calender. Both of these machines have established new standards for accuracy and economy.

All of the calenders represented by the 34 diagrams shown here have been built by Farrel-Birmingham time and again. As a result, you can be almost certain that the basic design for the "specialized" machine you require has already been worked out by Farrel-Birmingham engineers and proved on the job.

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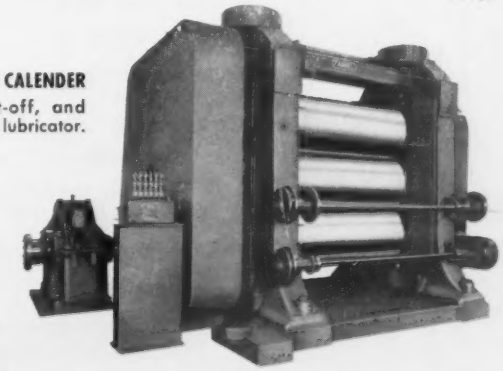

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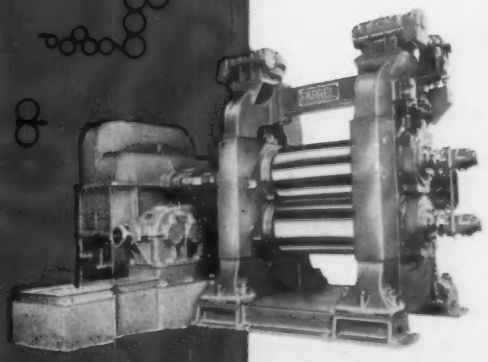

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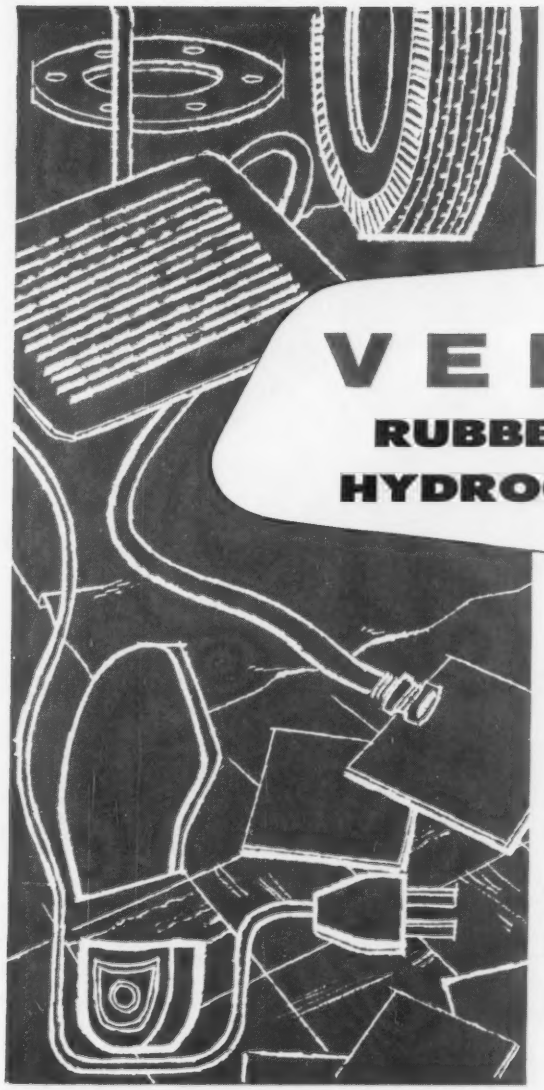
M. E. LERNER,
Editor



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Progress in Foamed Latex Sponge

By BAILEY BENNETT

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THE foamed latex sponge industry was born about a quarter of a century ago. It was destined to become the major consumer of rubber latex and so it remains today. Production zoomed from 18 million pounds during the best prewar year to 160 million pounds in 1953 *(2)*. The impetus for this growth may be traced in large measure to the unique properties of the product. However, the expansion of the industry has become a reality through a rapidly advancing technology. Research and development continue at a high level as reflected by a never-ending flow of patents and papers both in this country and abroad.

The purpose of the present article is to review progress in foamed latex sponge since World War II, particularly as revealed in publications of the past three or four years. Some of the items touched upon will be recognized as already enthusiastically adopted by the industry, while others are in the pilot plant or development stage. Still others remain at the idea or research level, awaiting further development or commercial exploitation when economic and other conditions are propitious.

Synthetic Latices

Successful large-volume production of an all-synthetic sponge has been a tempting problem for a number of years. Research in this area was spurred during World War II and after by the restrictions placed on the use of natural latex. The early GR-S latices, prepared at 50°C., were satisfactory for blending with natural latex, but were unsuitable for use alone. However, through the use of low-temperature polymerized GR-S latices, it is possible to prepare serviceable all-GR-S sponge.

This was illustrated by a study of Talalay and Talalay, in which the physical properties of foamed latex sponge made from a typical cold rubber latex were compared with those of sponge prepared from hot rubber latex having a similar composition *(86)*. Samples prepared from Hevea latex were used as reference standards. Selected data from this investigation have been used in Figure 1, which shows the sponge prepared from 5°C. GR-S latex to be markedly superior in physical properties to that made from 50°C. GR-S latex. The properties of the former also approach those of Hevea sponge sufficiently to make it competitive on a service basis.

Laboratory studies have shown that cold GR-S can be utilized in either of the two leading commercial processes for the manufacture of foamed latex sponge. All of the samples used in the above investigation were prepared by the Talalay process *(80)* in which the catalytic decomposition of hydrogen peroxide is utilized for foam formation. The foamed latex is rapidly frozen and then gelled by flushing the frozen foam with a coagulating gas (carbon dioxide). The more widely used Dunlop process *(19)* in which mechanical whipping of the latex is employed for the production of foam, followed by gelation with sodium fluosilicate, has been used to produce excellent all-GR-S sponge (see Figure 2).

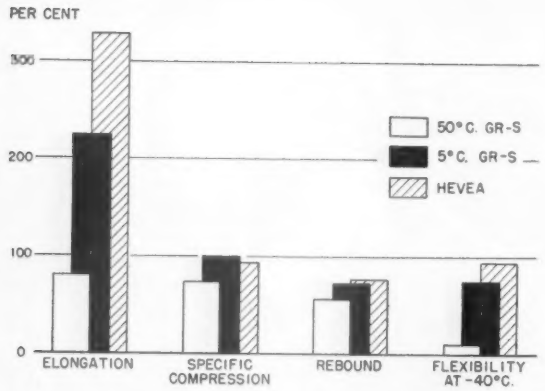

FIG. 1—Physical properties of foamed latex sponge prepared from various latices by the Talalay process.

In recent years, several of the cold GR-S latices produced by various plants operated for the RFC were designed primarily for use in foamed sponge (see Table I). These latices were prepared at temperatures near 5°C. Monomer conversion was carried to 60 to 80 per cent, and the latices were heat concentrated to final total solids contents of about 60 per cent. Polybutadiene latices X-621 and X-653 (later designated GR-S 2004) were also developed, by the Type V technique at 50 to 65°C., for blending with natural latex in the preparation of sponge. Such blends are preferable to the previously used natural rubber-Type V GR-S blends, since odor level of the finished sponge is considerably lower, a result of omitting styrene.

Research continues with latices both for the production of all-synthetic products and for improved blending materials. For example, an improved polybutadiene (X-711, later designated 2104) has been prepared at low temperature which results in contained polymer of improved physical properties with no increase in odor level. Other signs of progress are apparent. An article published in 1952 *(34)* outlined some of the problems being attacked: GR-S latices and contained polymers having lighter color, better aging characteristics, lower odor, lower latex viscosity, and lower non-rubber solids. Since then, sulfoxylate-activated systems (X-758, later designated 2105) have replaced sugar-free iron systems (X-619). The successful production of cold GR-S latices without iron has resulted in latex of better color.

The chief limitation to broader use of GR-S latex in foamed sponge is no longer quality of product, but rather one of supply. Demand for cold GR-S latex has exceeded supply ever since the latex became available. Superimposed on limited supply are the economics of the industry. The practical percentage of GR-S going into foamed latex sponge depends largely on its price compared with that of natural rubber latex *(78)*.

Foaming Processes

The Dunlop process remains the most widely used in the commercial production of foamed latex sponge. The industry continues to design new machines for the continuous production of foamed latex. In some of these devices, the actual mechanical entrainment of air is accomplished by means of multi-wire whip-type beaters *(57)*; in others, the latex is pumped through closed, horizontal systems that utilize series of specially constructed stator and rotor plates for the actual foam formation *(56, 74)*.

Continuous foaming equipment came into general use shortly after World War II. Since then the trend has been toward conversion to horizontal foaming for volume production operations. The early continuous foaming machines of this type were designed to handle up to 2,000 pounds of foam per hour. A smaller prototype has recently become available with a capacity of 150 to 190 pounds per hour *(1)*.

Several recently developed processes for the production of foamed latex resemble the Talalay process *(80)* in the use of catalytic decomposition of hydrogen peroxide. The commonly used decomposition agent is the enzyme catalase. Improved control over the decomposition is obtained by the use of inhibitors with the enzyme. Examples of such inhibitors are alkali metal cyanides *(6)* and hydroxylamine *(23)*. One process utilizes polyamines for the peroxide decomposition *(11)*. In still another process, hydrogen peroxide and a decomposing enzyme are combined with polyvinyl methyl ether *(38)*. In this process, the polyvinyl methyl ether acts as a gelling agent for the foam at temperatures above 35°C.

Some relatively new foaming processes embody characteristics of both the Dunlop and Talalay methods. In one of these, the latex is foamed by catalytic decomposition of hydrogen peroxide and is gelled with sodium fluosilicate *(22)*. In another process, mechanical whipping is used for foaming the latex and carbon dioxide is utilized as the gelling agent *(16)*.

In a process developed by the Commonwealth Engineering Company of Ohio, latex is foamed by means of expanding nitrous oxide. Latex containing a small percentage of sodium silicate is impregnated with nitrous oxide. Upon allowing the gas to expand, the latex is converted into a stable foam *(89)*. A number of patents cover various phases of this process, including method *(44)*, continuous process *(89, 90, 91)*, apparatus *(43)*, composition of matter *(77)*, foam rubber-textile combination materials *(40, 41)*, foamed rubber latex sheeting *(44)*, and stabilization of foamed latex with ethyl orthosilicate and ammonia *(42)*.

The Institut Français du Caoutchouc has devised a process for making cellular rubber from latex in which organic blowing agents are used for foam production *(65)*. Dinitrosopentamethylenetetramine (Vulcacel BN, Genolat) and a stabilizer such as sodium oleate are incorporated in the latex prior to loading in molds. Upon heating, the nitrogen formed by decomposition of the nitroso compound expands the latex into a cellular structure. If the charges are such that low density

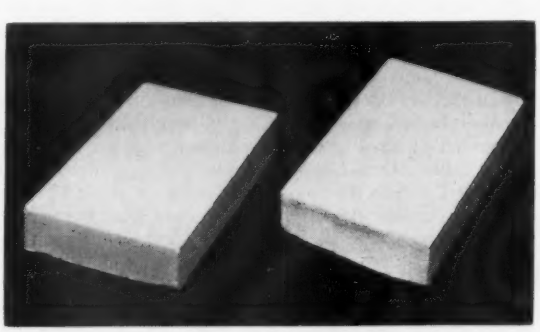

FIG. 2—All-GR-S foamed latex sponge prepared by the Dunlop process. Note the sharp contour lines and the fine uniform texture of the cut sample on the right.

TABLE I—COLD GR-S LATICES DESIGNED FOR SPONGE

Number	Charge-Ratio (BD/S)	Emulsifier	Conversion (per cent)	Mooney (ML-4)	Final Total Solids (per cent)
X-619	70/30	Neo-Fat K-242 + potassium oleate*	60	150–170	60 minimum
X-635	70/30	Potassium oleate + secondary	80	70–110	60–63
X-667 (2102)†	83/17	Potassium oleate + secondary	60	125–145	60 minimum
X-678	70/30	Potassium oleate + secondary	80	150–175	58–62
X-683	70/30	Neo-Fat K-242 + secondary	60	150–170	47–49
X-684	70/30	Neo-Fat K-242 + secondary	60	150–170	60–63
X-710 (2103)	70/30	Fatty acid soap	70	125–165	58
X-711 (2104)	100/0	Fatty acid soap	60	125–150	58 minimum
X-749	70/30	Rosin/Fatty acid soap; 65/35 ratio.....	60	75 (MS 1.5)	60
X-753	83/17	Potassium oleate + secondary	60	125-145	60
X-758 (2105)	70/30	Rosin/Fatty acid soap; 65/35 ratio.....	60	125-155	60–63

* Low-temperature recipes utilizing potassium oleate as the primary emulsifier generally also contain a secondary stabilizer like Daxad 11, Daxad 12K, or Tamol N. † Numbers in parentheses are those which later replaced the X numbers.

products result, the products will have a structure with interconnecting cells typical of foamed latex sponge. In such products, density at the surface is higher than that near the center. The higher the density of the material prepared by this method, the greater the tendency toward the formation of closed cell (non-foam) structures.

Molding, Forming, and Vulcanizing

Improvements in apparatus and methods of molding, forming, and vulcanizing foamed latex appear to have kept up with other technological advances. In fact, many of these particular improvements are a direct outgrowth of new production processes and products. For example, adoption of the Talalay process necessitated design of molding equipment suitable for in-mold foaming, gelling, and curing *(33, 81, 82, 84, 85)*. In another instance, a split flexible mold (itself made of rubber) has been designed to facilitate continuous production of foamed latex sponge strips *(29)*.

Other developments are reflected in various modifications of the familiar cored mold *(59, 95, 96, 101)* and special molds for high-frequency heating. The latter are formed in part from resin-glass laminated material *(72, 76)*. Molds can be filled with sensitized foamed latex through the use of low mechanical pressure *(29)* or air pressure *(32, 35)*, since the ungelled foam behaves in much the same manner as do more conventional fluids.

Mold surfaces generally receive some treatment prior to filling of the molds with foamed latex. Such treatment aids in removing the finished pieces from the molds or in obtaining special surface effects. Carbowax 4000 is widely used as a release agent. It has excellent release properties and a negligible effect on the foam itself. The material is sprayed on mold surfaces from water or isopropanol-water solutions *(47)*. Examples of mold surface treatments for special effects include water-soluble polymeric hydrophilic colloids for increasing the porosity of sponge surfaces *(73)* and solutions of glycerin, lanolin, or urea to form uniform velvety skin on the surface of the sponge *(37)*.

Several special forming techniques have been devised. By way of example, edges are formed by first heating gelled but uncured foam articles to prevent cracking, compressing the edge, e.g., with a die, then vulcanizing *(20)*. Equally ingenious processes have been invented for producing sponge articles having internal cavities *(79)*, and others having covering external membranes *(98)*. The latter process should be particularly valuable in producing such items as toy animals, dolls, etc.

Foamed latex sponge may be vulcanized by time-honored methods involving steam or by more recently developed processes utilizing infra-red or high-frequency heating. In any case, advances are continually being made in these areas. Improved methods of steam vulcanization involve the introduction of steam into the interior of gelled foam so that it will pass rapidly throughout the cellular mass *(46)*. The steam may be introduced by means of nipples or hollow cores *(26, 88)*, or through perforated molds or supports *(94)*. The steam may be supplied as low-pressure dry steam through a process that subjects superheated steam to a two-stage reduction in pressure *(97)*. The steam entering the foam is at a pressure of less than 2 psi.

In one instance, adoption of infra-red heating was reported to have accelerated the production of sponge by 50 per cent. Latex foam in aluminum molds is conveyed through an infra-red oven. The first zone provides rapid heating, the second zone adjusts mold temperature to 200°F., and the remaining zones maintain this temperature. Uniform heating is obtained by heaters placed at both top and bottom of the oven *(45)*.

A continuing interest in high-frequency electronic vulcanization is evidenced by patents disclosing methods and apparatus *(13, 14)*, molds, and special techniques. Mention has already been made of the peculiar requirements for molds used in this type of curing. High-frequency molds may incorporate spaced electrodes as a part of the molding surface. A zinc or cadmium coating on such electrodes is said to keep sponge surfaces free from pitting or discoloration *(93)*. Additional developments in this area include special techniques for vulcanization of foamed latex sponge articles that are thicker at one end than at the other *(75)*, and a process for electronic vulcanization of sponge to non-rubber articles *(60)*.

Gelation

Sodium fluosilicate remains the most widely used gelling agent in the latex sponge industry. It is interesting to note that this material has enjoyed its enviable position from the very beginning of the industry. This is due to its ready availability, favorable cost, and efficient action in the critical gelation process. In addition to the commercial success of fluosilicate gelation, the mechanism of the phenomenon has been the subject of a number of fundamental research investigations.

The gelling action of sodium fluosilicate has been attributed to the hydrofluoric acid *(92)* and silicic acid *(54, 62)* that are formed by hydrolysis of the salt in alkaline latex:

$$Na_2SiF_6 + 4\ H_2O \rightleftharpoons 2\ NaF + Si(OH)_4 + 4\ HF$$

Gelation is believed to be brought about by the sensitizing action of hydrofluoric acid (through reduction of pH) together with the tremendous surface area of the silicic acid and its sorptive capacity for the latex stabilizers. The mechanism has been further clarified by more recent studies on the influence of soaps on gelling characteristics of latex *(51)*. These investigations have shown that the gelling properties of natural latex can be improved by addition of cationic, destabilizing surfactants.

Other recent developments relating to fluosilicate gelation involve the use of diethylene glycol monooleate to delay the alkaline hydrolysis *(24)*, addition of *p*-nitrophenol which permits observation of proper dispersion of the gelling agent through color changes *(61)*, and the use of alkali-metal silicates with the fluosilicate as an aid in controlling cellularity of finished sponge products *(12)*.

The salts of fluotitanic acid have been shown to be useful as gelling agents for natural and synthetic latices *(48)*. Of these compounds, the sodium salt is particularly effective *(49)*. The mechanism of fluotitanate gelation of alkaline latices is doubtless similar to that of the isomorphous fluosilicate. However, in some cases, sodium fluotitanate is less sensitive to temperature change than is the corresponding fluosilicate. In certain foam mixes, sodium fluotitanate exhibited special effects such as stabilizing ungelled foams and improving dimensional stability during the gelation process. The gelation brought about by fluotitanates can be delayed by alkali-metal hydroxides *(15)* or fluorides *(50)*.

Any discussion of fluo-salt gelation of foamed latex must necessarily include reference to the important role played by zinc oxide, since this material is invariably present in a completely compounded latex. The effect of solubilized zinc in such compounds is well known, particularly its relation to premature local coagulation. Zinc oxide is somewhat soluble in alkaline latices, giving rise to complexes and polyvalent zinc ions *(39)*. These ions are powerful coagulants for the latex. The role of zinc compounds in the gelation of latex has formed the subject matter of several basic studies *(3, 18, 39, 53, 63)*, as well as being of great practical importance.

In the commercial production of foamed latex sponge, the usual practice is to withhold addition of zinc oxide until relatively late in the mixing cycle. This is done to avoid excessive local coagulation. A process for preparing foams that permits addition of zinc oxide early in the mixing cycle has been patented. This process is based on controlling the concentration of polyvalent zinc ions through adjustment of the conditions of the system so that the zinc oxide shows minimum solubility *(8)*.

Other relatively recent inventions relating to gelation disclose the use of polyvinyl methyl ether *(38)* and a water-soluble peroxide plus a low molecular weight aldehyde bisulfite addition product as gelling agents *(99)*.

Polyvinyl methyl ether is useful in this application because of its inverted solubility relation, i.e., the water-soluble compound becomes insoluble at temperatures above 35°C. and causes complete gelation of the latex. The role of cationic surfactants in gelation has already been mentioned. Recent patents in this area disclose long-chain cationic compounds of the quaternary amine type that are soluble in the serum of the latex *(52)*, and quaternary ammonium hydroxide as processing aids *(30, 31)*.

Reinforcement

Bennett and coworkers have successfully reinforced foamed latex sponge through incorporation of glass fiber of appropriate dimensions *(7)*. The properties of foams are altered somewhat by the glass. However, the most pronounced effects are apparent in the vulcanized products prepared from glass fiber-reinforced sponge. Shrinkage during processing is greatly reduced, resistance to compression is increased, and tensile strength is improved. These results are achieved with no obvious effects on the cell structure of finished products. Such reinforcement offers a practical method of tailoring foamed latex sponge for particular applications.

As already noted, the characteristics of foams are changed by the incorporation of glass fiber *(10)*. Since the glass generally acts as a foam thickener, it is valuable as a foam stabilizer. Substantial amounts of glass fiber can be added to most mixes without causing them to become so thick that pouring becomes difficult. The glass also acts as a sensitizer, thus promoting gelation. This activity is dependent on pH changes in the system. Glass fiber reduces the pH, probably as a result of leaching of the glass surfaces by the alkali present in latex.

Cotton linters having an average length of 0.46 mm, and possessing particular wetting characteristics, have been disclosed *(64)* for improving resistance to compression and tear strength of foamed latex sponge.

Colloidal silica may also be used for reinforcing foamed latex sponge. It is particularly effective in sponge having a high degree of unicellularity. In such foam products, 3 to 5 parts colloidal silica will afford substantial improvement in resistance to compression *(27)*. As with glass fiber, the properties of foams are changed by colloidal silica. It acts as a processing aid in low density foams, promoting gelation and thus stabilizing against cell collapse *(28)*.

Other Developments

Other recent advances in the field range all the way from special latex blends to improvements in physical testing. Some mention was made earlier of latex blends for the production of sponge. The properties of finished sponge products may be controlled in large measure by proper selection of the latex blend from which they are prepared. For example, odorless products having greatly improved aging properties, compared with those made from all-natural latex, can be obtained from blends of natural and polybutadiene latex *(102)*. Polybutadiene latex has been blended with butadiene-styrene copolymer latices to improve resilience of the finished products *(9)*. Blends of natural or GR-S latex with styrene-butadiene resinous copolymer latices can be used to produce foamed sponge showing high resistance to compression and capable of being readily sliced to thicknesses down to ⅛ inch *(100)*.

Compounding is also utilized to obtain particular effects during processing operations or in the finished sponge. Thus, the addition of 1 to 5 per cent (based on rubber solids) of certain amines reduces gel shrinkage during processing *(103)*. Collapse of the surface cells of frothed latex is inhibited during gelation by the addition of an acid derivative of guanidine *(69)*. A method of producing sponge having very fine cell structure, when using alkali-metal stearate soap as the foamant, involves compounding with sodium or potassium sul-

fide *(25)*. Hard paraffin wax is used, in emulsified form which is added to the mix, to produce foamed latex products showing good "snap" and low rate of combustion *(68)*. Resistance to photodegradation of cellular products prepared from natural latex can be greatly improved by the use of nickel dibutyldithiocarbamate *(66)*.

Instead of resorting to compounding to alter properties of latex foams and finished sponge, the products may be subjected to some type of after-treatment. One method of improving physical properties of foamed latex sponge comprises treatment with water solutions or slurries of alkaline-earth hydroxides, oxides, or salts *(70)*. Another after-treatment is designed to improve the fire resistance of sponge. The latter consists of immersing the products in hot saturated solutions of ammonium phosphate, nitrate or sulfate *(36)*.

Scrap foamed latex rubber may be utilized by grinding it to a size less than 32 mesh (National Bureau of Standards mesh specification), preferably between 35 and 50 mesh. In this form, it can be added to latex foam, and the product shows properties not appreciably different from unfilled foam *(67)*. Another method of extending precious latex is by use of an inert filler such as sawdust, cork, etc. A recently disclosed process claims up to 25 per cent of such fillers based on the weight of the rubber *(17)*.

New machines have been designed to expedite the production of sponge. Among these are devices for washing *(58)*, drying *(87)*, and splitting *(4)* preformed sponge products. Another machine has been devised for the continuous application of foam rubber cushioning to a carpet *(55)*.

With respect to evaluation of foamed latex sponge, recent developments include improved machines for measuring compression-deflection *(5, 21)* and various fundamental studies. Among the latter are studies comparing methods of accelerated aging *(71)* and those relating to the load-carrying capacity of sponge *(83)*.

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Coming Next Month...

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The Reinforcement of Butyl and Other Synthetic Rubbers with Silica Pigments

Part II—Effect of Surface Modification of Silica and Subsequent Heat Treatment

By A. M. GESSLER, H. K. WIESE and JOHN REHNER, Jr.
Esso Research and Engineering Co., Linden, N. J.

A PREVIOUS paper in this series *(1)* described the improved vulcanizate properties resulting from the heat treatment of Butyl and GR-S systems containing hydrated silica. Heat treatment response in this work was obtained by the use of a chemical promoting agent which, through proposed action with the hydroxyl groups attached on the silica particle surface, was postulated to form associations between pigment particles and the polymer chains and, thereby, to destroy undesirable cohesive pigment structure. It was shown that vulcanizates prepared in this way were characterized by greatly improved stress-strain properties and by sharply reduced stiffness and hysteresis.

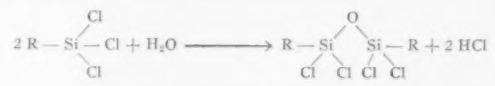
The heat treatment of silica masterbatches with a chemical promoting agent like Dibenzo G.M.F. (*p*-quinone dioxime dibenzoate) yields a dark brown color in the rubber mass. This color, while it can be masked with titanium dioxide to form near-white and pastel colors, does not permit the production of pure white compounds such as are used in tire sidewalls. For this reason, work with silica pigments was extended. It was found that results similar to those obtained from promoted heat treatment could be obtained without concomitant masterbatch discoloration by chemically modifying the silica itself. This paper describes these modifications and shows their effect on the corresponding polymer admixtures. Thermal interaction was used to produce vulcanizates with the best physical properties.

Compound

The filller used in this work was Hi-Sil 202, a fine particle, hydrated silicon dioxide which was described in the previous paper *(1)*. Except where otherwise noted, the compounds were prepared according to established formulations which were taken from the literature *(2)* and are shown in Table I. As in the previous work, heat treatment was effected by milling the masterbatch 20 minutes at 300 to 310°F. prior to the addition of vulcanizing agents. Butyl compounds were cured for 45 minutes at 307°F. The other compounds were cured for the same time at 287°F.

Silica Modification

Hi-Sil may be chemically modified with organohalosilanes. The silane, taken at a given weight per cent based on the silica, is first dissolved in 2 liters of *n*-hexane. Two hundred grams of Hi-Sil are then added to this solution and the resulting slurry is stirred until reaction is apparently complete. Halosilanes condense with water to form polymeric siloxanes:



This reaction is violent and probably takes place immediately, utilizing free water held on the silane. As soon as Hi-Sil is added to the hexane solution an effervescence is developed and HCl is evolved. Following this there is a continued reaction during which the silica undergoes a color change, usually to a deep green or blue green. The latter reaction, which is slower, is also accompanied by the evolution of HCl, and is presumed to involve a further condensation of the silane with bound water or hydroxyl ions attached to the surface of the silica particles. Hexane is finally evaporated off the silica and the latter is dried in a vacuum oven at 85°C. The intensity of color in the dried product is greatly reduced and no difficulty is encountered, therefore, in producing pure white rubber mixtures.

TABLE I—COMPOUND FORMULATIONS

Masterbatch				
Enjay Butyl 217	100.0	—	—	—
Smoked sheet	—	100.0	—	—
GR-S (L.T.P.)	—	—	100.0	—
Hycar OR-25	—	—	—	100.0
Hi-Sil 202	40.0	60.0	60.0	60.0
BxDC[1]	2.0	—	—	—
Stearic acid	—	3.0	—	1.5
P.B.N.[2]	—	1.0	1.0	—
Diethylene glycol	—	—	3.5	—
Vulcanizing Agents				
Zinc oxide	5.0	5.0	5.0	5.0
Sulfur	2.0	3.0	3.0	2.0
Tellurium diethyldithiocarbamate	1.0	—	—	—
3-Anilinomethyl-2[3]-benzothiozolethione	1.0	—	—	—
2,2'Benzothiazyl disulfide	—	0.8	0.75	1.5
Di-ortho-toluyl guanidine	—	1.2	1.5	—
Tetramethyl thiuram disulfide	—	—	—	0.5
Cumar P-25[3]	—	—	10.0	12.5
Dibutyl phthalate	—	—	—	12.5

(1) Butoxyethyl diglycolcarbonate. (2) Phenyl-beta-naphthylamine. (3) Polymers of indene, cumarone and related coal tar compounds.

TABLE II—PROPERTIES OF BUTYL-HI-SIL VULCANIZATES PREPARED BY FOUR DIFFERENT METHODS

Preparation Method	a	b*	c*	d†
Modulus at 300%	295	440	675	975
Lbs./In.² 500%	750	1080	1825	2250
Tensile Strength, Lbs./In.²	2500	2750	2950	2750
% Elongation	770	770	665	575
$\eta f \times 10^{-6}$, Poises x C.P.S.	4.09	1.94	1.56	1.48
$K \times 10^{-7}$, Dynes/Cm²	8.95	6.78	6.12	6.42
% Relative Damping	30.9	20.5	18.5	16.9

* Hi-Sil modified with 6 Wt. % cyclopentadienyltricholorosilane. † Heat treatment promoted with 0.6 Wt. % (on polymer) Dibenzo G.M.F. and activated with 3 Wt. % glycerol.

Modified Silicas in Butyl

General: Halosilane modification of Hi-Sil alone does not lead to generally improved stress-strain properties in Butyl vulcanizates. It does, however, lead to increased elasticity, i.e., to decreased ηf, an absolute damping term taken from the Yerzley oscillograph to describe the work lost as heat when the sample is dynamically flexed *(3)*. Thus, the undesirable stiffness and high permanent set normally associated with compounds of this type *(1)* are reduced.

Hi-Sil, which itself is not responsive to unpromoted heat treatment *(1)*, yields sharp heat treatment responses in Butyl if it is modified with an organohalosilane. Modulus and tensile strength are greatly increased and ηf, already reduced as a result of the pigment modification, is reduced further. Taken collectively, these changes resemble those obtained from promoted heat treatment.

Table II shows some of the properties of Butyl-Hi-Sil vulcanizates prepared by (a) conventional mixing with untreated pigment, (b) conventional mixing with modified pigment, (c) heat treatment with modified pigment, and (d) promoted heat treatment without pigment modification. In the table, K refers to the dynamic modulus *(3)*. The use of glycerol in compound (d) may account for the high values of modulus obtained. The activating action of glycerol *(1)* has not yet been studied in systems containing modified silica.

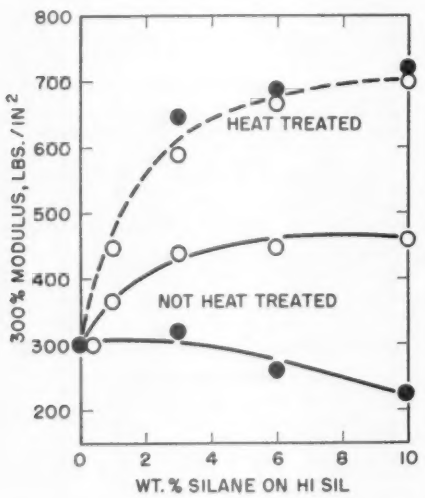


FIG. 1—Effect of silane modification on modulus of Butyl vulcanizates. (The open and closed circles refer to cyclopentadienyl- and vinyl-trichlorosilane, respectively).

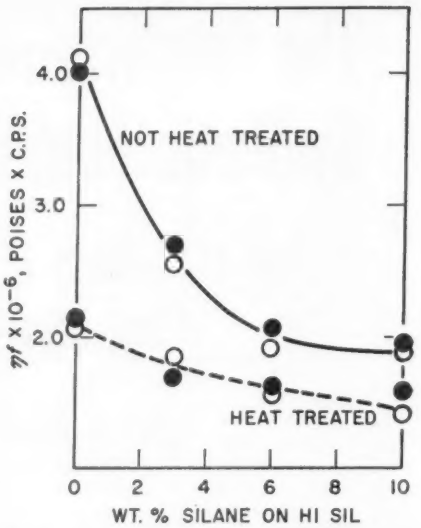


FIG. 2—Effect of silane modification on dynamic properties of Butyl vulcanizates. (The open and closed circles refer to cyclopentadienyl- and vinyl-trichlorosilane, respectively).

Effect of Silane Concentration: Hi-Sil was modified with varying amounts of silane using cyclopentadienyl and vinyltrichlorosilane, respectively. Figure 1 shows the effect of these modifications on the modulus of the corresponding Butyl vulcanizates. With vinyltrichlorosilane, no advantage results if heat treatment is not applied. Under the same conditions, the use of cyclopentadienyltrichlorosilane leads to definite increases in modulus. This difference is rather surprising and cannot yet be explained. Silane modification of Hi-Sil produces a pigment which is responsive to heat treatment, one which, like channel black, requires no chemical promoting agent to yield a thermal interaction effect. This is an important development because it eliminates

TABLE III—EFFECT OF ALTERNATE SILANES ON THE TENSILE PROPERTIES OF BUTYL VULCANIZATES

Hi-Sil Modification	None		Cyclopentadienyl Triisopropoxysilane		Ethyl Trichlorosilane	
Compound Preparation	A	B	A	B	A	B
Modulus at 300%	330	390	455	360	175	330
Lbs./In.² 500%	800	1040	1150	960	350	910
Tensile Strength, Lbs./In.²	2390	2555	2750	2740	2645	2660
% Elongation	755	760	725	795	870	710

Note: A—Conventionally mixed; B—Heat treated.

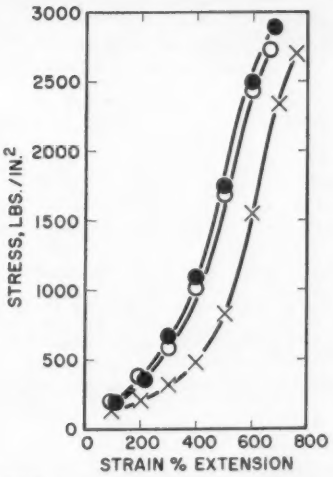


FIG. 3—Comparison of pure trichlorosilane with mixture of mono- and di-chlorosilanes as Hi-Sil modifier in heat-treated Butyl compounds. (Crosses refer to standard Hi-Sil, open circles to Hi-Sil with 3% cyclopentadienyltrichlorosilane, and closed circles to Hi-Sil with 3% residue from trichlorosilane preparation).

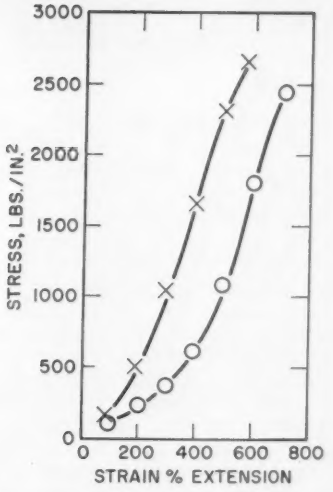


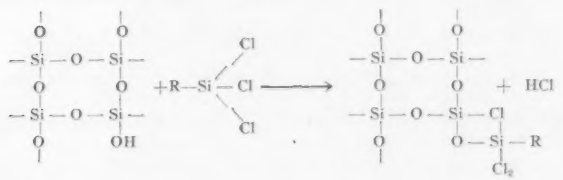
FIG. 4—Effect of adding silane directly to Butyl-Hi-Sil masterbatch. (The crosses and circles refer to masterbatch with and without silane addition, respectively).

the color associated with promoted heat treatment and permits the preparation of pure white goods.

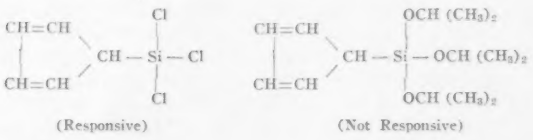
The curve in Figure 1 (dashed line) rises rapidly at first, then tends to level as the concentration of silane is carried above about 6 per cent. Incidentally, the latter figure corresponds, at least approximately, to monolayer coverage of the silica surface. Thermal interaction appears to cancel out the difference already noted for the two silanes in conventionally mixed Butyl compounds, and to lead finally to the same modulus level in both vulcanizates.

The effect of silane modification on the damping properties of Butyl-Hi-Sil systems is shown in Figure 2. Sharp reductions in ηf result from either unpromoted heat treatment or silica modification. The greatest improvement, however, occurs when heat treatment is applied in compounds containing modified silica. The action of the two silanes appears identical in this case, no differences being found in either heat treated or conventionally mixed systems.

Effect of Silane Structure: It is believed that halosilanes are attached to the silica surface through unimolecular condensation with the hydroxyl groups held on the pigment as bound water *(4, 5, 6)*:



Evidence to support this view was found in the fact that Hi-Sil modified with a silane in which the chlorine units were replaced by isopropoxy groups did not become responsive to heat treatment:



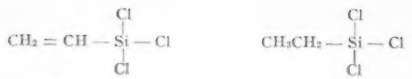
In the latter case, it is assumed that attachments were not made on the silica and, as a result, it was not possible to obtain thermal interaction, i.e., to form links between filler particles and the polymer chains.

Response to heat treatment requires more than just attaching the silane to the silica surface. Evidence is found both in our work and in the work of others *(8)* that the silane must also contain unsaturation. As an example, the authors found that ethyltrichlorosilane, unlike vinyltrichlorosilane, does not yield pigment which is responsive to heat treatment:

TABLE IV—PROPERTIES OF NATURAL RUBBER-HI-SIL VULCANIZATES PREPARED BY FOUR DIFFERENT METHODS

Compound Preparation	Conventionally Mixed		Heat Treated	
Hi-Sil	S	M	S	M
Modulus at 100%	550	440	500	400
Lbs./In.² 300%	1550	1350	1930	1790
Tensile Strength, Lbs./In.²	2735	3070	3150	3265
% Elongation	445	500	475	475
$\eta f \times 10^{-6}$, Poises x C.P.S.	7.47	5.55	1.90	1.83
K x 10^{-7}, Dynes/Cm.²	21.8	15.8	10.9	9.81
% Relative Damping	24.2	24.7	13.0	13.9

Note: S—Standard Hi-Sil 202; M—Hi-Sil 202 modified with 6% cyclopentadienyltrichlorosilane.



(Responsive) (Not Responsive)

The attachment of unsaturated centers on the pigment surface presents opportunity for reaction between the polymer and the pigment, perhaps through sulfur during the course of vulcanization *(7)*, and is believed to account for the thermal interaction effects observed.

Hi-Sil, in the above work, was treated with 6 per cent of each of the silanes considered. Data which were obtained from the resulting vulcanizates are given in Table III.

Further work on the effects of silane structure revealed that mono- and di- as well as mixtures of mono-, di-, and tri-chlorosilanes, are useful in rendering Hi-Sil responsive to heat treatment. In early experiments, cyclopentadienyltrichlorosilane, prepared from silicon tetrachloride and cyclopentadiene, was isolated from the reaction mixture by distillation, leaving as the residue a mixture of the corresponding mono- and di-chlorosilanes. Figure 3 shows that this residue is as effective for modifying Hi-Sil as is the pure trichlorosilane. Thus, with the need for distillation eliminated, the cost of modification would be reduced.

Hi-Sil, in mixtures with Butyl and other polymers, may be modified directly with organohalosilanes. The silane is added to the masterbatch on the mill or in the Banbury. Heat treatment then affords the opportunity first for attaching the silane to the pigment surface, and second for thermally interacting the modified pigment with the polymer. Stress-strain curves in Figure 4 show the effect of adding 6 per cent (on the pigment) of mixed cyclopentadienylchlorosilanes (the reaction mixture from $SiCl_4$ and cyclopentadiene) to a Butyl-Hi-Sil masterbatch. Data in the figure are given for systems which were hot milled for 10 minutes at 310°F. Evidence that the silane reacts with Hi-Sil on the hot mill is found in the fact that HCl is liberated, presumably as a result of condensation involving both free and bound water on the pigment.

Modified Silica in Other Polymers

Modified Hi-Sil was briefly investigated in other polymers using 6 per cent cyclopentadienyltrichlorosilane as the modifier. The stress-strain properties of vulcanizates prepared from natural rubber (Table IV) are not greatly altered by pigment modification, heat treatment, or the combined action of both of these processes. However, flexibility and dynamic properties, as judged by ηf, K, and % relative damping, are very significantly improved by heat treatment alone. No particular advantage is found in these data for modified Hi-Sil.

The results with GR-S (Table V) are similar to those with natural rubber, except that in this case the highest value for tensile strength and the lowest value for ηf are obtained from heat treating masterbatch with modified silica. It is surprising that with both natural rubber and GR-S the heat treatment response, as judged by the increase in 300% modulus, is not influenced by pigment modification.

Acrylonitrile-butadiene copolymers such as Hycar OR-25 (Table VI) show a much greater responsiveness to heat treatment when halosilane-reacted Hi-Sil is employed in the masterbatch. In conclusion, the benefits derivable from silica modification, heat treatment of the masterbatch, or from the combination of these two processes, are important but do not follow the same pattern for all types of elastomers.

TABLE V—PROPERTIES OF GR-S-HI-SIL VULCANIZATES PREPARED BY FOUR DIFFERENT METHODS

Compound Preparation	Conventionally Mixed		Heat Treated	
Hi-Sil	S	M	S	M
Modulus at 100%	300	290	240	235
Lbs./In.² 300%	600	700	835	925
500%	1650	1650	1860	2060
Tensile Strength, Lbs./In.²	2100	2475	2700	3360
% Elongation	540	590	585	640
$\eta f \times 10^{-6}$, Poises x C.P.S.	8.65	9.26	4.04	3.52
$K \times 10^{-7}$, Dynes/Cm.²	15.6	16.8	10.6	10.4
% Relative Damping	36.4	36.1	26.4	23.9

Note: S—Standard Hi-Sil 202; M—Hi-Sil 202 modified with 6% cyclopentadienyltrichlorosilane.

TABLE VI—PROPERTIES OF HYCAR OR-15-HI-SIL VULCANIZATES PREPARED BY FOUR DIFFERENT METHODS

Compound Preparation	Conventionally Mixed		Heat Treated	
Hi-Sil	S	M	S	M
Modulus at 100%	315	350	325	400
Lbs./In.² 300%	890	1270	1100	2075
500%	1880	—	2165	—
Tensile Strength, Lbs./In.²	2030	1920	2165	2075
% Elongation	515	415	500	300
$\eta f \times 10^{-6}$, Poises x C.P.S.	5.13	3.29	3.00	2.42
$K \times 10^{-7}$, Dynes/Cm.²	13.4	10.8	9.80	9.90
% Relative Damping	26.6	21.7	21.8	17.8

Note: S—Standard Hi-Sil 202; M—Hi-Sil 202 modified with 6% cyclopentadienyltrichlorosilane.

ACKNOWLEDGMENT

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SPECIAL NOTE

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An index to Volume 77 of RUBBER AGE will be found in this issue on Pages 163 to 166. Extra copies of this index are available on request.

Standard Natural Rubber

By R. D. STIEHLER and F. L. ROTH

National Bureau of Standards, Washington 25, D. C.

A study was made of the feasibility of blending in a Banbury mixer "yellow" TC (technically classified) smoked sheet to prepare a uniform lot for a standard sample of natural rubber. Samples from 16 bales and 4 blends made from them by the Goodyear Tire & Rubber Co. were studied at the National Bureau of Standards for this purpose. The results indicated that the Banbury mixer produces a uniform blend of rubber, but a second blending would be required to eliminate variations among blends in order to produce a sufficiently large lot for a standard sample. In addition, the study showed that strain for an ACS I vulcanizate cured 40 minutes at 140° C. is not adequate to characterize a rubber. The variation among bales of "yellow" TC rubber confirmed the need for the use of a reference standard in the classification of natural rubber production.

ABOUT 1949 some of the rubber plantations began to test and classify a part of their production of natural rubber *(1)*. This development was of great interest in the United States, particularly since the quality of most synthetic rubber production was governed by specifications. The experience with the control of quality of synthetic rubbers, particularly when one type of rubber is produced in several plants, indicated that standardization of testing was of the utmost importance *(2, 3)*. It was found that the equipment and procedure for preparing and testing vulcanizates had to be standardized and standard compounding ingredients used. In addition, it was found necessary to test daily a reference lot of rubber to prevent systematic errors by unknown factors from causing faulty grading of production.

The need of a reference rubber for the classification of natural rubber is even greater since there is much less standardization of testing among the laboratories of the world than among the (former) Government synthetic rubber plants. ASTM Committee D-11 recognized this need and recommended the establishment of a standard lot of natural rubber. Such a standard was also needed for the standard formulations in ASTM Designation D15-52T *(4)*.

The problem of establishing a standard lot of natural rubber has been primarily technical in nature. A lot should consist of 10 to 15 tons that is uniform throughout. A survey of likely sources of such a lot indicated that sprayed latex offered the greatest promise *(5)*. Unfortunately, the vulcanization characteristics of this rubber differed so much from smoked sheet and pale crepe that it was not suitable for a standard material.

Mr. J. J. Hoesly, of the Goodyear Tire and Rubber Company, recently suggested the use of "yellow" TC (technically classified) rubber that had been blended in a Banbury mixer, and subsequently pelletized, for the standard rubber. The present report is a study of the feasibility of this suggestion. It also includes information that resulted from this study bearing on the present technical classification of natural rubber.

Experimental

Sixteen bales of "yellow" TC rubber from a single delivery to the Goodyear Tire and Rubber Company were sampled before and after blending in a No. 27 Banbury mixer. The bales were taken at random and four bales were blended at one time. The rubber was mixed for three minutes at a rotor speed of 25 rpm and reached a temperature between 320 and 340° F. After mixing, the rubber passed to a Farrel-Birmingham pelletizer having a 20-inch screw with a speed of 20 rpm. The pellets leaving the pelletizer were sprayed with a suspension of kaolin to prevent adhesion.

Sampling of the rubber before blending was accomplished by cutting a section from the corner across the sheets of each bale *(6)*. The sections from the four bales in each blend were suitably identified. Since the pellets came continuously from the pelletizer, an effort was made to take three groups of pellets—one near the beginning, one near the middle, and one near the end of each blend as it issued from the pelletizer. Each group of pellets was identified by position and blend. The 16 sections from the bales and the 12 groups of pellets were forwarded to the National Bureau of Standards for test.

The rubber was compounded in accordance with the ACS I formulation *(7)* and the mixing procedure given in Section 6 of ASTM Designation D15-52T *(4)*. In order to compensate for day-to-day variations and any order effects, the 28 compounds were prepared in duplicate in accordance with the design shown in Table I. The viscometer cure characteristics at 125° C. were determined within six hours after mixing following the procedure in ASTM Designation D1077-49T *(4)*. Both temperature and Mooney viscosity were continuously

TABLE I—DESIGN FOR TEST

Day	Order			
	4	2	1	3
1	A1	A2	A3	A4
6	A4	A3	Aa	Ab
14	Aa	Ab	Ac	Ba
4	Ba	Ac	Bb	Bc
12	Bb	Bc	B1	B2
2	B2	B1	B3	B4
9	B3	B4	C1	C2
7	C2	C1	C3	C4
10	C3	C4	Ca	Cb
3	Cb	Ca	Cc	Da
8	Cc	Da	Db	Dc
11	Dc	Db	D1	D2
5	D1	D2	D3	D4
13	D4	D3	A1	A2

EXPLANATORY NOTE

A, B, C, D represent the four Banbury blends.
1, 2, 3, 4 represent the four bales in each blend.
a, b, c represent the pellets corresponding to the beginning, middle, and end of each blend.

Note: This article is based on a report made by the authors to Subcommittee XII on Natural Rubber of Committee D-11 on Rubber and Rubberlike Products of the American Society for Testing Materials.

TABLE II—VISCOMETER CURE CHARACTERISTICS

	t_s*				Δt†			
	A	B	C	D	A	B	C	D
Bale 1	10.38	8.88	11.78	12.67	2.47	2.24	2.96	2.59
	10.62	8.90	11.65	12.44	2.68	2.23	3.07	2.99
Bale 2	12.54	13.80	11.98	11.15	3.06	2.80	2.74	2.61
	12.08	12.64	12.50	11.95	3.10	2.76	2.75	2.70
Bale 3	11.00	11.98	11.70	11.80	2.84	2.79	2.70	2.70
	10.98	12.54	11.10	11.65	2.77	2.86	2.70	2.75
Bale 4	11.95	9.77	13.50	11.00	2.79	2.43	3.45	2.25
	11.70	10.03	12.70	9.02	2.80	2.51	3.48	2.24
Average	11.41	11.07	12.11	11.46	2.81	2.58	2.98	2.60
Pellets a	11.84	11.21	10.80	11.18	2.96	2.65	2.58	2.62
	11.94	11.20	11.66	11.18	2.83	2.66	2.66	2.59
Pellets b	10.98	10.87	12.08	10.84	2.72	2.53	2.88	2.54
	12.12	11.08	12.26	11.00	2.80	2.52	2.80	2.60
Pellets c	11.30	10.88	12.58	10.60	2.78	2.58	2.87	2.45
	11.52	10.70	12.80	10.60	2.78	2.40	2.98	2.49
Average	11.62	10.99	12.03	10.90	2.81	2.56	2.80	2.55

* Time in minutes in Mooney viscometer at 125° C. required for viscosity to pass through a minimum and increase 5 units.
† Time in minutes required for viscosity to increase from 5 to 35 units above the minimum.

recorded until the viscosity increased about 40 units above the minimum. Also, within six hours after mixing, standard sheets were cured for 20, 30, 40, and 80 minutes at 125° C. in accordance with ASTM Designation D15-52T *(4)*. Strip specimens were cut from the sheets the following day and the strain was measured one minute after the application of a stress of 5 kilograms per square centimeter *(8)*.

Analysis of Data

The viscometer cure data are given in Table II and the strain data in Table III. The analysis of variance for these data is given in Table IV. A comparison of the mean squares for day, order, and residual shows that there is no significant day or order effect; therefore, the 16 degrees of freedom for day and order are combined with the 12 degrees of freedom for residual to give 28 degrees of freedom for total error.

The mean squares for bales and pellets of the same blend reflect the reduction in variability by blending. Although the variability of the pellets is about one-eighth that of the original bales, there is still a significant amount of variability among pellets from the same blend, particularly in Blend C. An examination of the individual values in Tables II and III reveals that the values for the *b* and *c* groups of pellets are nearly identical, but those of the *a* group are always intermediate between the values for the *b* and *c* groups of the same and the preceding blend. Since the pellets were produced continuously, it appears that the end of one blend became mixed with the beginning of the next blend in the pelletizer and that the Banbury mixer probably produced a homogeneous blend.

The mean squares for blending and the averages for bales and pellets in Tables II and III reflect the effect of blending and pelletizing on the properties of the rubber. The values indicate that these operations may produce a slight effect on rate of cure, but no noticeable effect on the time of incipient cure or strain for 80-minute cure.

The mean squares for "between blends" are comparable in magnitude to those for bales in the same blend as expected, since the bales for each blend were selected at random.

TABLE III—STRAIN AFTER ONE MINUTE UNDER A STRESS OF 5 KG/CM²

	E20* Cure 20 min. at 125° C.				E30* Cure 30 min. at 125° C.			
	A	B	C	D	A	B	C	D
Bale 1	170	142	259	246	110	96	146	140
	191	140	260	234	119	99	149	136
Bale 2	293	254	207	185	160	134	127	116
	267	215	261	194	150	126	134	116
Bale 3	215	232	210	210	130	134	124	125
	213	236	207	220	130	136	121	132
Bale 4	226	170	358	139	135	114	179	96
	240	172	332	142	138	112	170	99
Average	227	195	262	196	134	119	144	120
Pellets a	232	199	188	209	136	120	118	121
	224	195	188	195	133	121	120	119
Pellets b	220	177	241	182	133	114	134	113
	229	183	235	181	134	114	136	114
Pellets c	215	182	256	173	127	111	140	109
	221	171	240	170	128	111	136	110
Average	224	184	225	185	132	115	131	114

	E40* Cure 40 min. at 125° C.				E80* Cure 80 min. at 125° C.			
	A	B	C	D	A	B	C	D
Bale 1	90	82	113	112	67	65	80	76
	95	81	112	106	70	65	80	77
Bale 2	119	103	98	94	83	74	72	68
	115	97	101	92	80	72	74	70
Bale 3	103	100	98	99	75	78	72	73
	101	104	99	101	74	76	72	75
Bale 4	105	93	131	81	76	71	84	64
	106	94	125	82	76	72	82	65
Average	104	94	110	96	75	71	77	71
Pellets a	106	97	94	98	76	73	71	73
	103	97	95	95	75	74	72	73
Pellets b	103	92	105	92	76	71	76	70
	103	92	106	92	76	72	77	71
Pellets c	100	91	108	90	75	70	77	70
	102	91	103	89	76	70	77	69
Average	103	93	102	93	76	72	75	71

*E20, E30, E40, and E80 represent percent elongation of vulcanizates cured at 125° C. for 20, 30, 40, and 80 minutes, respectively.

Discussion

The results of this study indicate that the Banbury mixer is effective in making a homogeneous blend of rubber. However, the large variability among bales in a shipment of TC rubber of the same class causes considerably more variation among blends than can be tolerated in a standard lot of natural rubber. This difficulty might be resolved in two ways: one would be to test each bale of rubber and select groups of bales for blending that have the same average characteristics; the other would be to blend the rubber twice. The second method appears more practical and should result in more uniform mate-

TABLE IV—ANALYSIS OF VARIANCE

Effect	D.F.*	Mean Squares					
		t_s	Δt	E20	E30	E40	E80
Rubber	27	1.90	0.122	3611	544	196	37
Bales in blend	12	3.20	0.152	4618	704	257	52
Pellets in blend	8	0.37	0.021	710	85	33	8
Blending	4	0.32	0.033	1394	190	63	4
Between blends	3	2.90	0.392	10276	1602	560	99
Total Error	28	0.18	0.0060	137	9.6	4.3	0.96
Day	13	0.21	0.0073	120	5.3	4.6	0.95
Order	3	0.21	0.0065	84	20.5	3.2	0.83
Residual	12	0.14	0.0044	167	11.5	4.4	1.01

* Degrees of freedom.

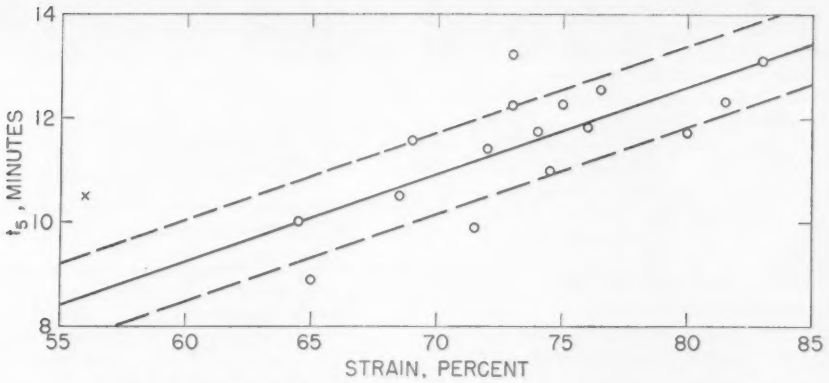

FIG. 1—Comparison of viscometer incipient cure (t_5) and strain at 5 kg/cm² for vulcanizates cured 80 minutes at 125°C. The circles represent 16 bales from one delivery and the cross represents a bale from another delivery of TC "yellow" rubber. The solid line is the least square regression of the 16 circles and the dashed lines represent the limits within which 95 percent of the points are expected.

rial. In making the second blend, equal portions from each of the first blends would be suitably combined. Thus, the twice-blended rubber should be uniform both within and between blends.

Even though a uniform lot can be prepared in this manner, it would be desirable to select for blending, bales produced from a single blended lot of latex. Such bales might be sufficiently alike that a single blending operation would suffice. In any case, the more uniform the starting material the easier it is to obtain a uniform lot.

The results of this study also provide information on the present technical classification of natural rubber. As mentioned previously, this study involves 16 bales from a single recent delivery of No. 1 smoked sheets, technically classified yellow. This classification is based on the strain after one minute under 5 kg/cm² for a vulcanizate cured 40 minutes at 140° C. Other work at the National Bureau of Standards shows that the strain value for such a vulcanizate is essentially identical with that for a vulcanizate cured 80 minutes at 125° C.

Comparison of these strain values with the time of incipient cure, t_5, and with the index for rate of cure, $\triangle t$, is therefore appropriate. These comparisons are shown in Figures 1 and 2, respectively. The solid line is the linear regression of t_5 or $\triangle t$ with respect to the strain for the 80-minute cure at 125° C. The dashed lines represent the limits within which approximately 95% the points should lie if their scatter were caused solely by experimental error in both the abscissa and the ordinate. It is seen that of the 16 bales, 6 in Figure 1 and 3 in Figure 2 lie outside these limits.

The standard error of estimate (the standard deviation of the points in each figure from the regression line) was calculated for comparison with the maximum value that would be expected from the experimental error. The following values were obtained:

	Standard Error of Estimate	
	t_5 min.	$\triangle t$ min.
Actual	1.18	0.147
Maximum Expected ...	0.37	0.069

The maximum expected standard error of estimate and the dotted lines in Figure 1 and 2 are based on the values for total error given in Table IV. An examination of the replicate values for bales and pellets in Tables II and III reveals a much smaller error for pellets than for bales. Thus, the total error in Table IV includes both random error of test and the variability in the rubber within bales.

The following mean squares apply to the 12 sets of duplicate values for pellets: t_5—0.10, $\triangle t$—0.0036, E20—35, E30—1.8, E40—2.1, and E80—0.33. If these values

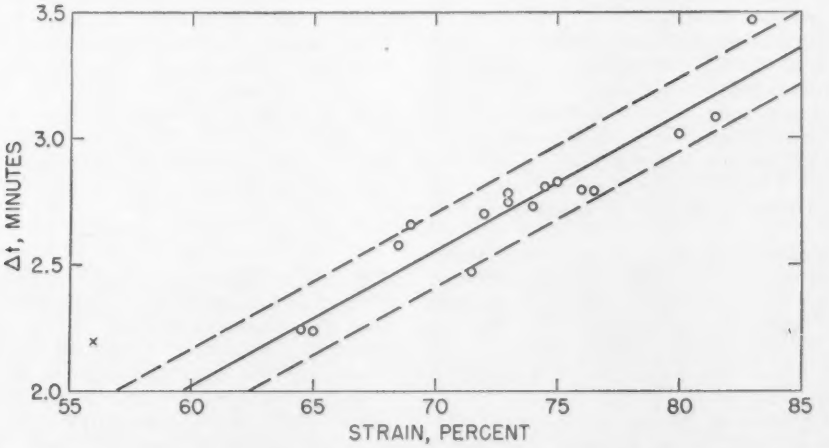

FIG. 2—Comparison of viscometer cure index ($\triangle t$) and strain at 5 kg/cm² for vulcanizates cured 80 minutes at 125°C. The circles, cross and lines have the same meanings as those in Figure 1.

are used for total error of test, in place of those in Table IV, the dotted lines in Figures 1 and 2 become closer together and the maximum expected standard errors of estimate for the points in these figures become 0.25 minute for t_5 and 0.049 minute for $\triangle t$. These smaller limits cause 9 of the 16 bales in Figure 1 and 4 in Figure 2 to lie outside the expected limits.

The data in Figures 1 and 2 and the standard errors of estimate lead to the conclusion that the characteristics measured by t_5 and $\triangle t$ are only partly reflected by the strain for an 80 minute cure at 125° C. This conclusion is substantiated by a comparison of the values of t_5, $\triangle t$, and E80 obtained in this study with those shown by crosses in Figures 1 and 2. The crosses represent a bale of No. 1 smoked sheet TC "yellow" rubber from another delivery.

In addition to confirming the necessity of three parameters to describe the vulcanization characteristics, these results also show that large differences in t_5, $\triangle t$, and E80 may be expected in TC rubber from different sources. The range of strain values for the 17 bales of "yellow" TC No. 1 smoked sheet in Figures 1 and 2 is from 56 to 83 percent (a difference of 27). The classification limits for this rubber *(9)* are 67 and 91 percent (a difference of 24). Undoubtedly, the range of values of "yellow" TC rubber being delivered is larger than that found for the 17 bales tested thus far at the National Bureau of Standards. Presumably, this large variation results from insufficient standardization of the laboratories classifying rubber. The use of a reference standard should result in more uniform classification of natural rubber production.

ACKNOWLEDGMENT

This study was made at the request of ASTM Committee D11 in cooperation with Mr. J. J. Hoesly and the Goodyear Tire and Rubber Company. The authors also wish to acknowledge the assistance of Mr. G. W. Bullman and Mr. W. D. Phillips in the experimental work and of Mr. J. Mandel and Mr. G. M. Martin in the statistical part of the work.

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Rubber Cores Utilized in Pre-Stretched Concrete Installation

THE Walnut Lane Bridge over the Lincoln Drive in Fairmont Park, Philadelphia, Penna., marks a milestone in bridge construction of both national and international interest. Considered an engineering "first," the bridge was built in this country by the new pre-stretched concrete method. The Quaker Rubber Corporation, of Philadelphia, was instrumental in supplying rubber material during the bridge's construction.

Hundreds of pencil-thick steel cables have been strung through the lanes of the concrete girders or beams to give a "live" and somewhat elastic factor to what would have been ordinarily a mass of inert concrete. A long series of tests were conducted at the bridge site, prior to completion, to see how much strain beams could take. The demonstration brought more than 300 engineers from all over the United States and from foreign countries.

The concrete girders used were of two types: those of the center span, each of them 160 feet long, carrying 256 wires of high tensile strength, a little more than ½-inch diameter, while the approaches of the bridge on either side were 74 feet long, weighing about 80 tons and carrying 192 wires. The forms for the pouring of the concrete were built in the bridge supports themselves. It took ten hours to fill one of the forms with a special mixture of concrete and to insure that it settled properly around the rubber cores leaving room for the wire. Once the concrete had set—requiring as much as 28 days—the wooden forms were removed and the rubber cores pulled from the length of the girder. In the place of these cores went the wires which were anchored securely at each end of the girder. Hydraulic jacks were used to exert a pull on the wires in order to provide pre-stretching.

The items supplied by Quaker were known simply as rubber cores, measuring 2 1/6-inch x 2⅛-inch x 81 feet. Other cores 76 feet long with 1⅛-inch hole in the center were also manufactured. The hole was made in order to space a ¾-inch pipe to support the rubber which was inserted in the center. The cores were made in separate lengths, so they could be inserted from each end of the beam. High-grade natural rubber of a very high tensile strength and elongation was used.

Reliance Electric & Engineering Co., Cleveland, Ohio, has introduced a complete new line of **industrial direct-current motors.** These new motors, designated the Super T Line Motors, are described as producing the fastest and most accurate response ever offered in a standard design motor, and are reported to be twice as effective in many applications as any other motor now produced. The new motors are being produced in sizes from 20 to 100 h.p., the company states.

Division of Rubber Chemistry, A. C. S., Meets in Philadelphia on November 2-4, 1955

THE 68th Meeting of the Division of Rubber Chemistry of the American Chemical Society will be held at the Bellevue-Stratford Hotel in Philadelphia, Penna., on November 2, 3 and 4. The meeting will feature the presentation of 24 technical papers, the Charles Goodyear Lecture, an invited paper, a luncheon-meeting of the 25-Year Club, the Annual Suppliers Cooperative Cocktail Party, the divisional banquet, and a special ladies' program.

The technical program has been divided into four sessions, each with a general theme. The session on Wednesday afternoon, November 2, will be devoted to "Methods of Quality Evaluation," that on Thursday morning, November 3, to "Compounding Techniques," the one on Thursday afternoon to "New Synthetic Rubbers," and the final session on Friday morning, November 4 to "General Papers."

Following the system introduced by Seward Byam (DuPont) last year, different chairmen will preside over each session. John Ball (Midwest Rubber Reclaiming), chairman of the Division, will preside over the first, J. W. Snyder (Columbian Carbon) over the second, A. E. Juve (Goodrich) over the third, and B. S. Garvey, Jr. (Sharples Chemicals) over the final session. All regular papers will be judged for the "Best Paper Award."

Program of the
DIVISION OF RUBBER CHEMISTRY
AMERICAN CHEMICAL SOCIETY

Bellevue-Stratford Hotel, Philadelphia, Penna.
November 2-4, 1955

Wednesday Morning—November 2
9:00 A.M.—Registration.
12:05 P.M.—25-Year Club Luncheon.

Wednesday Afternoon—November 2
2:00 P.M.—Introductory Remarks by J. M. Ball (Midwest Rubber Reclaiming), Division Chairman.
2:05 P.M.—Technical Papers.

Thursday Morning—November 3
9:00 A.M.—Technical Papers.
11:20 A.M.—Charles Goodyear Lecture by Dr. R. P. Dinsmore (Goodyear).

Thursday Afternoon—November 3
2:00 P.M.—Technical Papers.

Thursday Evening—November 3
5:00 P.M.—Suppliers' Cooperative Cocktail Party.
7:00 P.M.—Divisional Banquet.

Friday Morning—November 4
9:00 A.M.—Technical Papers.

Goodyear Lecture by Dinsmore

The Charles Goodyear Lecture will be presented by Dr. R. P. Dinsmore, vice-president in charge of research and development for the Goodyear Tire & Rubber Co., the 1955 Goodyear Medalist. The lecture, under the title of "Specifications of a Rubber Chemist," will be given during the session on Thursday morning. Presentation of the Medal will be made during the divisional banquet, which will be held at the Bellevue-Stratford on Thursday evening.

In connection with the Goodyear Award, a short talk on "Dinsmore—the Man and His Work" will be given by Arthur W. Carpenter. Dr. Carpenter, who was associated with the B. F. Goodrich Co. from 1927 until his retirement earlier this year, during which he largely acted as manager of the physical testing laboratories, has known Dr. Dinsmore for many years and is well qualified to make the address. For the record, Dr. Carpenter, who served as president of the American Society for Testing Materials in 1946-47, has been secretary of Committee D-11 on Rubber Products since 1928. He was made an honorary member of the society this year.

The policy of invited papers was instituted by Mr. Ball at the 1955 Spring Meeting. It is being continued at the current meeting. The paper, entitled "The Technical Manpower Situation," will be presented at the Wednesday afternoon session by Dr. Albert W. Davison, vice-chairman of the Engineering Manpower Commission of the Engineers Joint Council.

Dr. Davison holds a B. S. degree from Cornell University, an M. S. from Ohio State University, and a Ph. L. from Cornell. He also holds a doctor of engineering degree from Rensselaer Polytechnic Institute, and a doctor of science degree from Denison University. He has taught chemistry at Ohio State, Cornell, the University of Cincinnati and at Rensselaer Polytechnic and was formerly head of the Department of Chemical Engineering at the latter institution. Dr. Davison was also director of research for the Owens-Corning Fiberglas Corp., Newark, Ohio, from 1949 to 1953. He has been a consulting chemist and chemical engineer since 1953. Dr. Davison is a member of the A. C. S., A. I. C. E., and other scientific groups.

As usual, activities at the meeting will get underway with a luncheon-meeting of the 25-Year Club, with Arthur H. Nellen (Lee Rubber) presiding as chairman. The Annual Suppliers Cooperative Cocktail Party will be held on Thursday evening, November 3, preceding the divisional banquet. Special surprises are being planned for the banquet, over and beyond the usual program of entertainment.

An interesting and extensive program for the ladies is also being arranged. This will include a tea and entertainment in the Burgundy Room of the Bellevue-Stratford on Wednesday afternoon, a motor tour to Independence Hall and Valley Forge on Thursday, and a coffee hour on Friday morning. The only charges will be for the motor tour.

Each registrant at the meeting will receive gratis,

courtesy of the Philadelphia Rubber Group, a copy of "Collected Lectures from the Philadelphia Rubber Group's Course on Basic Rubber Technology." Although formal registrations will begin on Wednesday morning, facilities will be available for registering on Tuesday evening for early arrivals.

Dr. Garvey is acting as chairman of the Local Arrangements Committee, with A. J. DiMaggio (Firestone) as vice-chairman. Chairmen of specific activities include: *Banquet,* M. A. Youker (DuPont); *Technical Sessions,* J. S. Sweely (Sun Oil); *Registration,* R. A. Garrett (Armstrong Cork); *Printing,* R. J. Salyerds (Harwick Standard); *Publicity,* E. J. Strube (DuPont); *Ladies' Entertainment,* G. J. Wyrough (Wyrough & Loser).

Abstracts of the papers scheduled for presentation, together with their authors and company connections, follow:

ABSTRACTS OF PAPERS

Wednesday Afternoon—November 2

Methods of Quality Evaluation

J. M. Ball, Presiding

2:00 P.M.—1—Introductory Remarks.

2:05 P.M.—2—Ozone Cracking of Rubber: Objective Evaluation through Creep Measurement. *H. M. Leeper and G. L. Gable (Monsanto Chemical Co., Nitro, West Va.). (Paper will be presented by Mr. Leeper).*

A test for ozone resistance has been designed wherein continuous, objective and non-destructive measurement is made of the extent of ozone cracking in elastomeric vulcanizates. The test involves the measuring of continuous creep of ring specimens cut from flat vulcanized sheets, 0.025 to 0.030 inch thick. There is suspended from the ring a dead load of sufficient mass to produce an initial extension of 20%. Because of the high ratio of surface to volume of the specimen, the loss of supportive cross-sectional area accompanying ozone cracking results in appreciable lengthening of the loaded ring. Plots of ring length versus exposure time provide a continuous description of the extent of ozone cracking.

The method may be used as an indoor accelerated test or in outdoor exposures. The data presented represent exclusively outdoor exposures of tire tread vulcanizates containing experimental antiozonants. The duration of the test in warm weather varies from one week for poorer antiozonant additives to one to two months for the more effective additives.

The fact that the observed creep is attributable almost entirely to ozone cracking as opposed to oxidative deterioration is demonstrated. The degree of correlation of results with those of indoor accelerated tests and other outdoor tests is described. The effectiveness of wax as an additive is shown. The variables, state of cure and antiozonant concentration are reported.

2:30 P.M.—3—Exposure Tests of Chlorosulfonated Polyethylene Compounds. *H. A. Winkelmann (Dryden Rubber Division, Sheller Manufacturing Corp., Chicago, Ill.).*

Colored chlorosulfonated polyethylene (Hypalon) compounds may be made with blends of natural rubber and GR-S type styrene rubber. Low hardness compounds may be made by further addition of white oil or Carbowax as extenders.

Exposure tests of these compounds have been made in Chicago, Ill., Miami, Fla., and under the RS Sunlamp. Observations were made for color retention, chalking, crazing and cracking with and without strain. Color changes under the RS Sunlamp are much more severe than after outdoor exposure. Stabilizers and extenders may be added to the compounds that help maintain color under prolonged exposure. Chicago exposures show chalking but this chalking can be reduced by selection of stabilizers, fillers and extenders. Crazing of Hypalon compounds is observed under all exposure conditions but can be reduced to a minimum by the elimination of clay.

Cracking of Hypalon blends was observed when the compounds were exposed with and without strain in Chicago and Florida. Cracking under strain can be retarded by the addition of certain stabilizers and extenders. Cracking of Hypalon blends exposed without strain is quite general in Chicago and Florida atmospheres. There are some stabilizers and extenders that eliminate this type of cracking. Hypalon blends of natural rubber and GR-S type styrene rubber can be made with good color retention in which the tendency toward chalking, crazing and cracking has been reduced to a minimum or eliminated.

2:55 P.M.—4—A Study of the Effects of Gamma Radiation on Rubber Compounds and Polymers. *J. W. Born (B. F. Goodrich Co. Research Center, Brecksville, Ohio).*

During 1954 a study was conducted to evaluate the resistance of rubber compounds to radiation damage, learn something of the mechanisms of rubber deterioration during nuclear irradiation, and develop means of preventing such deterioration.

Some 200 vulcanized rubber compounds underwent gamma radiation exposures ranging from 0.1 to 70 megaroentgens, inclusive. The deterioration of the rubber compounds was evaluated by conventional stress-strain and stress relaxation measurements. Special stress relaxation measurements during irradiation indicated much less deterioration of rubber in vacuum than in air. Irradiation products of rubber compounds were analyzed with a mass spectrometer and an infrared spectrophotometer.

The study produced a catalog of stress-strain data for 190 rubber compounds as a function of gamma radiation dose. Among pure gum rubber compounds, natural rubber has the best radiation resistance. GR-S type styrene rubber, Hycar 1001, Hypalon, and carboxylic polyethylacrylate gum rubber compounds have good resistance. Polyisobutylene, Hycar PA-21, and Thiokol ST gum rubber compounds have the poorest resistance of the materials tested. The corresponding black rubber compounds showed similar variations in resistance.

Chemical additives were found which markedly inhibit radiation damage, giving at least a ten-fold improvement. The half-time of continuous stress relaxation of pure gum natural rubber during irradiation is twice as long in vacuum as in air.

(NOTE: The research described herein was conducted under a contract with the Materials Laboratory of the Wright Air Development Center, Dayton, Ohio).

3:15 P.M.—5—The Technical Manpower Situation. *A. W. Davison (Engineering Manpower Commission, Engineers Joint Council, New York, N. Y.).*

A contributed paper. No abstract available.

3:50 P.M.—6—The Effect of High Temperature on the Properties of Organic and Silicone Rubbers. *G. M. Konkle, J. T. McIntyre and J. V. Fenner (Dow Corning Corp., Midland, Mich.). (Paper will be presented by Mr. Konkle).*

The behavior of elastomers at high temperature is of increasing interest. Much data is available on the effect of heat aging in which the properties of the vulcanizates were determined at room temperature. Relatively little information is available about properties of vulcanizates aged and tested at elevated temperatures.

Hardness, tensile strength and elongation of natural rubber and several synthetic rubbers were measured at temperatures from room to 482° F. The effect of aging at elevated temperature was combined with testing at these temperatures.

Natural rubber, GR-S type styrene rubber, Butyl, neoprene, nitrile, polyacrylic, 1,1-dihydroperfluoro butyl acrylate (Poly FBA), a copolymer of acrylic ester and acrylonitrile (Acrylon BA-12) and silicone rubbers were studied.

All rubbers tested showed a drastic reduction in strength and elongation at elevated temperatures. Some polymers show better heat resistance than natural rubber or GR-S type styrene rubber when properties were determined at room temperature after heat aging. However, these polymers are more drastically af-

fected than natural rubber or GR-S type styrene rubber when tested at elevated temperatures.

When tensile samples are conditioned at elevated temperatures only long enough to reach temperature equilibrium, and properties obtained after testing at these temperatures show natural rubber to be best up to 300°F., the tensile strength and elongation of silicone rubber is superior to any other rubber compounds investigated. However, when the samples are first aged at elevated temperatures and then tested at the same elevated temperatures, silicone rubber is the best of the rubbers evaluated at 250°F. or above.

4:10 P.M.—7—Compounding of Silicone Rubber. IV—Testing of Silicone Rubber at Elevated Temperatures. ***Aldo J. DeFrancesco, Roger D. Alling and John H. Baldridge (Connecticut Hard Rubber Co., New Haven, Conn.). (Paper will be presented by Mr. DeFrancesco).***

An apparatus for measuring tensile strength, elongation and tear strength of rubber compounds at elevated temperatures was designed and constructed. The test apparatus was combined with a Scott Tensile Tester. Emphasis was placed on simplicity of construction and on validity of comparative test results. It is known that silicone rubber, in comparison with other rubbers, has by far the best resistance to high temperature aging. More information with respect to the properties of silicone rubber at high temperatures is necessary. Tensile strength, elongation and tear strength of various silicone compounds were determined at room temperature, 200°, 300° and 400°F. It was found that these properties decrease markedly at elevated temperatures. A discussion of the results is presented.

4:35 P.M.—8—A Discussion of Some Factors Influencing the Duplicability of Tire Road Wear Testing. ***L. R. Sperberg (Three-T-Fleet, Odessa, Texas).***

Many factors influence tire wear and the measurement of abrasion losses during road testing. This paper is concerned with a discussion of some of these factors. Factors affecting abrasion resistance calculations as reflected by methods of calculation, test methods, duplicability of measurements, and the influence of the number of test tires are discussed. In addition, the effects of tire position on the test vehicle, the mechanical condition of test vehicles particularly wheel alignment and balance, type and condition of roadway surface, tread profiles, atmospheric and tire temperatures, vehicle speed, tire load and trailer positions are also discussed as they influence the final calculations of tire performance.

Thursday Morning—November 3

Compounding Techniques

J. W. Snyder, Presiding

9:00 A.M.—9—Highly-Stabilized Non-Discoloring Rubber Compositions. ***D. B. Merrifield (Monsanto Chemical Co., Nitro, West Va.).***

Conventional aromatic amine antidegradants, although superior to the relatively non-discoloring phenolics, cannot be used in white rubber or rubber adjacent to enamelled surfaces because of migration, staining and discoloration. A non-discoloring dithioamine vulcanizing system, using a thiazole as an accelerator and a hindered hydroquinone as an antidegradant, is described which possesses excellent resistance to heat aging and ozone attack, as well as markedly improved processing safety. Free radical mechanisms are postulated to explain some of the observed results.

9:25 A.M.—10—Vulcanization of Butyl with Other Rubbers. ***F. P. Ford and R. L. Zapp (Esso Research and Engineering Co., Linden, N. J.). (Paper will be presented by Mr. Ford).***

The incompatibility of Butyl with other rubbers, except neoprene, has long been recognized. Usually, mixtures of Butyl and other polymers of higher unsaturation yield porous, blistered, laminated or cracked products when vulcanized.

Various techniques have been used to improve the compatibility of Butyl with other rubbers. These include precuring and chemical modification of Butyl. Other methods have more recently been found by which standard grades of Butyl may apparently be vulcanized with other rubbers in any proportion. Vulcanizates of such mixtures have been prepared by two methods: (1) the addition of a lead oxide, such as PbO or PbO_2 to blends containing conventional "ultra" accelerators, and (2) the use of certain specific "mild" accelerators, in the absence of an "ultra" accelerator. In the latter case, lead oxides are not desirable. Specific accelerators which are reasonably effective include butyraldehyde-aniline products, diphenyl guanidine, diorthotolyl guanidine, 2-mercaptoimidazoline, triethyltrimethylenetriamine and N-cyclohexyl-2-benzothiazole sulfenamide.

Vulcanizates prepared by either of the above mentioned methods appear to be dense, homogeneous and free of defects usually associated with mixtures of Butyl and other rubbers. Volume swell measurements in cyclohexane fail to extract rubbery material. This fact is taken as evidence that both polymers in such blends are chemically cross-linked. These vulcanizates are characterized by relatively high extension modulus, low elongation, low tensile strength and high hysteresis. Such properties are dependent upon the proportion of Butyl rubber in the blend. Tensile and elongation are at a minimum in blends containing 75 parts Butyl in 100 parts total rubber hydrocarbon. In such compositions, with 50 parts of SRF black for example, tensile strengths are in the order of 1300 pounds psi and elongation about 300%. Better properties are obtained with either lower or higher proportions of Butyl.

Practical applications of these reactions are in the development stage. However, it has been shown that they facilitate the preparation of harder Butyl vulcanizates than has hitherto been believed possible. Semi-ebonites have been made with high sulfur loadings in Butyl compounds containing minor amounts of GR-S type styrene rubber.

9:50 A.M.—11—Sulfur Vulcanization of Vinyl-Substituted Polysiloxanes. ***K. E. Polmanteer and R. J. Koch (Dow Corning Corp., Midland, Mich.). (Paper will be presented by Mr. Polmanteer).***

The principal method used for cross-linking linear polysiloxanes to produce an elastic state has been with the aid of peroxides such as benzoyl peroxide. This work describes results obtained from vulcanization studies of vinyl containing linear polysiloxanes using sulfur and accelerators as the cross-linking agents. It was found that olefinic groups, such as vinyl attached to silicon, were necessary to permit sulfur vulcanization in this polymeric system.

The rate of vulcanization and the ultimate state of cure were found to be dependent upon the content of vinyl groups in the polymer. Like other sulfur-vulcanizable polymers, the choice of accelerator to use with sulfur also played an important part in determining vulcanization rates in this polysiloxane system. Strong organic bases, guanidines, and thiuram disulfides are the most active accelerators in this polymeric system, while zinc oxide and organic acids inhibit and retard vulcanization.

As is the case with some organic polymers, certain accelerators, such as tetramethylthiuram disulfide, were found to be suitable vulcanizing agents without the aid of elemental sulfur. The temperature coefficients for rate of vulcanization ranged from 2.54 down to 1.85 per 10°C. change in temperature while the Arrhenius activation energies for this system ranged from 31.5 down to 20.3 kilocalories per mole. Both the temperature coefficients and the activation energy values depended upon the type of accelerators present.

10:15 A.M.—12—Effect of Varying the Vulcanization Temperature on the Physical Properties of Black Reinforced Tread Compounds. ***J. V. Svetlik and H. E. Railsback (Phillips Petroleum Co., Bartlesville, Okla.). (Paper will be presented by Mr. Svetlik).***

Recent technological developments have permitted tire manufacturers to adopt the use of shorter curing cycles at higher temperatures. Advantages accrue to the rubber tire manufacturer

and customer alike because production costs are thereby reduced. However, increasing the curing temperature can alter the physical properties of rubber stocks. As the vulcanization temperature is increased and curing time is decreased to attain the same state of cure some of the physical properties are improved while others are deteriorated, which may affect performance of the finished product.

To evaluate the effect of temperature on physical properties, specimens were vulcanized for variable periods of time at 253°, 280°, 307° and 343°F. Typical tread type compounds reinforced with FEF, HAF, ISAF and SAF carbon blacks were studied to establish if the reinforcement imparted by different blacks is affected by varying the vulcanization conditions. The changes in stress-strain, hysteresis, hardness, crack growth and abrasion resistance properties have been investigated as a function of vulcanization time and temperature.

Compounds vulcanized at progressively higher temperatures possessed lower modulus, higher hysteresis and lower dynamic hardness. Vulcanizates prepared at high temperature contain less free sulfur and appear to possess better crack growth resistance. The properties imparted by the different blacks are compared and their reaction to varying the vulcanization conditions is discussed.

10:40 A.M.—13—The Effect of Carbon Black on the Oxidation of Rubber. *F. Lyon, K. A. Burgess and C. W. Sweitzer (Columbian Carbon Co., New York, N. Y.). (Paper will be presented by Mr. Lyon).*

Previous studies in this laboratory show that the oxidation reactions of unvulcanized cold rubber (LTP GR-S type styrene), as measured by oxygen absorption, intrinsic viscosity, and solubility, are inhibited by carbon black. The present study extends these investigations to the oxidation of non-sulfur GR-S type vulcanizates, to the effect of carbon black on the physical properties of heat treated unvulcanized cold rubber films, to the role of the acetone extractable fraction of GR-S on the rate of oxidation and cure of carbon black-cold rubber films, and to the effect of carbon black on the oxidation of natural rubber films.

The effect of carbon black on the oxidation of GR-S type vulcanizates was found to be dependent on the curative system. Carbon black inhibits the oxidation of dicumyl peroxide vulcanizates to the same degree as previously reported for unvulcanized rubber films. This fact is in contrast to the accelerating effect of carbon black on the oxidation of sulfur vulcanizates reported by Case Institute [*Ind. Eng. Chem.*, Vol. 38, p. 1052 (1946)] and confirmed in this laboratory. In rubber as well as other polymer systems carbon black can inhibit or accelerate oxidation and polymerization reactions depending on the other compounding ingredients present.

Static heating of unvulcanized cold rubber films at 125°C. initiates scission reactions thereby softening the sample as indicated by the strain-time relationship. If carbon black is present, however, identical heat treatment stiffens the film, indicating that carbon black not only inhibited the scission reactions, but also bonds with the polymer. The physical properties of unvulcanized films aged at room temperature show that carbon black inhibits oxygen-induced cross-linking of the polymer molecules.

The effect of carbon black on the benzoyl peroxide oxidation of cold rubber is dependent on the acetone extractable fraction of the rubber, while with oxygen or air oxidation, the acetone extractable fraction plays a relatively minor role. With unextracted cold rubber, carbon black has been shown to accelerate the benzoyl peroxide gelation, while with acetone-extracted rubber carbon black inhibits gelation.

The effect of carbon black loading on natural rubber oxidation is similar to that previously reported for cold rubber.

11:05 A.M.—Business Meeting.

11:20 A.M.—14—Goodyear Medal Lecture: Specifications of a Rubber Chemist. *Dr. R. P. Dinsmore (Goodyear Tire & Rubber Co., Akron, Ohio).*

No abstract available.

Thursday Afternoon—November 3

New Synthetic Rubbers

A. E. Juve, Presiding

2:00 P.M.—15—Carboxylic Rubber. *J. Green and E. F. Sverdrup (U. S. Rubber Reclaiming Co., Buffalo, N. Y.). (Paper will be presented by Mr. Green).*

The chief use of scrap rubber has been for the manufacture of a controlled intentional degradation product known as reclaimed rubber. To date little has been accomplished in utilizing scrap rubber as a low cost starting material for controlled polymer synthesis. This paper discusses a carboxylic type elastomer prepared from tire scrap and the properties of such elastomers. Comparisons of these elastomers with the familiar polychloroprene rubbers are given.

Unsaturated compounds containing an electrophilic group, such as a carboxyl group, alpha to a double bond, have been combined with natural and GR-S type vulcanized rubber scrap. The vulcanized rubber scrap is replasticized and combined with the above unsaturates in one operation. A reaction mechanism is discussed.

The resulting products have Mooney viscosities (ML/212/5-1) of up to 125. Tensile strengths of up to 2000 psi and Shore A hardnesses of as high as 80 can be obtained on vulcanizates containing no additional reinforcing filler. The degree of reaction and scrap used are governing factors in connection with vulcanizate properties. These self-reinforced vulcanizates have oil resistance and excellent aging properties.

Increasing the concentration of the unsaturates increases the Mooney viscosity of the uncured material and the tensile strength, modulus, durometer and torsional hysteresis of the revulcanized material. The benzol extract on uncured acetone-extracted samples decreases with increasing concentration of unsaturates.

These carboxylic elastomers show versatility with respect to methods of vulcanization. Sulfur requirements are reduced and excellent non-sulfur cures are obtained by the use of bivalent metal oxides as the curing agents. Other curatives are glycols, diamines, epoxy resins and diisocyanates. The mechanism of vulcanization is discussed briefly.

The oil resistance of these carboxylic elastomers is generally equivalent, when compounded, to that of the polychloroprenes. The prospect of a "built-in" antioxidant, chemically part of the polymer, is a distinct possibility. Other properties discussed include aging, ozone resistance, compression set, use in blends with other elastomers, and the processing characteristics. These elastomers can be extended with large quantities of petroleum and/or ester oils.

A number of applications for the carboxylic elastomers are suggested where advantage may be taken of the oil resistance, good aging, and comparatively low cost.

2:25 P.M.—16—Ameripol SN — A Synthetic *Cis*-Polyisoprene. I—Polymer Preparation and Properties. *S. L. Horne, Jr., J. P. Kiehl, J. J. Shipman and V. L. Folt (B. F. Goodrich Co. Research Center, Brecksville, Ohio). (Paper will be presented by F. K. Schoenfeld).*

A rubber has been synthesized which has the same unit structure as the natural rubber hydrocarbon. Since the latter is recognized to be a *cis*-polyisoprene, the new rubber is termed a synthetic *cis*-polyisoprene. Infrared absorption spectra of the unvulcanized material and of its hydrochloride (except for minor peaks due to oxidation) and X-ray diffraction pattern of the stretched vulcanizate are identical to those of Hevea rubber. A sample of synthetic *cis*-polyisoprene showed the same second order transition temperature as that of Hevea rubber (—68°C). The iodine number and elemental analysis check closely with values for Hevea rubber. Mooney viscosity (ML 4 mins. at 212° F.) is usually in the 50 to 75 range. Tack of the polymer is like that shown by milled Hevea rubber.

Intrinsic viscosities of the new rubber run as high as 4 (in toluene). Solvents in the solubility parameter range of 8.6 ± 1.35 appeared to be solvents for both synthetic *cis*-polyisoprene and for milled pale crepe Hevea rubber. Preliminary work on the

ratio of viscosity average to number average molecular weights indicates that the molecular weight distribution of synthetic *cis*-polyisoprenes is somewhat comparable to that of milled Hevea rubber. Stabilization of the synthetic polymer can be adjusted so that its rate of oxygen uptake at 100° C. is no greater than that of Hevea crepe rubber.

2:40 P.M.—17—Ameripol SN — A Synthetic *Cis*-Polyisoprene. II—Processing and Vulcanization. *E. A. Willson (B. F. Goodrich Co. Research Center, Brecksville, Ohio). (Paper will be presented by F. K. Schoenfeld).*

Synthetic *cis*-polyisoprene rubber stocks have been milled on laboratory equipment and in factory Banbury mixers. No preliminary breakdown is required when the Mooney viscosity (ML 4 mins. at 212°F.) of the polymer is in the 50 to 75 range. Compounding pigments are easily milled and dispersed in the rubber. Factory batch stocks processed well on calenders and in extruders and extruded treads showed less linear shrinkage and less extrusion porosity than ordinary Hevea rubber treads.

The absence of non-rubber constituents in synthetic *cis*-polyisoprene as made, leads to slow rates of cure in many accelerator systems. The addition of 1½ parts of soya lecithin and 0.075 part of triethanolamine to the ACS test recipe brings the rate of cure of the rubber, the stress-strain properties and the stress relaxation values of the vulcanizates into line with those of Hevea rubber. Comparable physical properties result when such treated synthetic *cis*-polyisoprene replaces Hevea rubber in tread and carcass stocks.

2:55 P.M.—18—Ameripol SN — A Synthetic *Cis*-Polyisoprene. III—Tire Testing. *M. A. Reinhart and E. A. Willson (B. F. Goodrich Research Center, Brecksville, Ohio). (Paper will be presented by F. K. Schoenfeld).*

The regular factory truck tire evaluation procedure has been carried out on 11.00 × 20-12 ply rating highway express and bus tires using synthetic *cis*-polyisoprene throughout in current factory recipes.

Indoor Wheel Test: Tires were run continuously on a smooth 67-inch diameter wheel in an ambient temperature of 100° ± 5°F. at a speed of 50 miles per hour under load which was increased by standardized increments each 24 hours. Heat build-up in the *cis*-polyisoprene rubber tires, as measured by thermocouple and by increase of air pressure in the tires, was in close agreement with results obtained on Hevea rubber control tires. Mileages to failure were comparable to those of the controls.

Test Truck Operation: Tires were run on test trucks in Texas under carefully regulated test conditions as to load, speed and inflation pressure. Load was increased by standardized increments to 150% of Tire and Rim Association rated load. The carcasses of the synthetic *cis*-polyisoprene tires were sound after 19,600 miles of operation and, though about 35% of the tread pattern remained, they were recapped and placed in intracity bus operation. Tread wear and independent cracking were slightly inferior to those of the Hevea controls but resistance to growth of initiated tread cuts was comparable to that of the Hevea controls.

Mileage Contract Buses: Synthetic *cis*-polyisoprene tires have been placed in rigorous intercity bus operation where speeds may be higher than 70 miles per hour. The tires are operating entirely satisfactorily. Tread wear is as good and in some cases slightly better than that of the Hevea control tires. Independent tread cracking is slightly inferior to that of the controls but the severity is not alarming. Service tests were initiated during the hot summer months, adding to the significance of the results obtained.

3:20 P.M.—19—A *Cis*-Polyisoprene Having the Molecular Structural Features of Hevea Rubber. *F. W. Stavely (Firestone Tire & Rubber Co., Akron, Ohio).*

Coral rubber is a polyisoprene elastomer having chemical composition, x-ray crystalline pattern and polymer structure very similar to natural Hevea rubber. This rubber is characterized by high gum tensile values (up to 3000 psi) and low hysteresis with good retention of properties at elevated temperature. It is superior to cold rubber (LTP GR-S type) in these characteristics.

Coral rubber is a *cis*-1,4 polyisoprene containing up to 93.8% of *cis*-1,4, 6.1% of 3,4 and no *trans*-1,4 or 1,2 structure. Our recent results show natural Hevea rubber to be 97.8% *cis*-1,4 with 2.2% 3,4 structure and balata to be 98.7% *trans*-1,4 with 1.3% 3,4 structure. Analysis by ozonolysis and perbenzoic acid procedures appear to support these findings. The data obtained appear to confirm that high *cis*-1,4 head-to-tail structure is a desirable feature in attaining those properties which are characteristic of natural rubber.

Coral rubber differs from natural rubber in that the vulcanizates exhibit better resistance to cracking and have better thermal stability than natural rubber vulcanizates. In the unvulcanized state, Coral rubber is more sensitive to light. From a technology standpoint, Coral rubber is compatible in all proportions with natural rubber and with GR-S type synthetic rubbers. Processing characteristics, rate of cure and other properties require minor compounding adjustments.

4:00 P.M.—20—Kel-F Elastomer: Properties and Applications. *M. E. Conroy, F. J. Honn, L. E. Robb and D. R. Wolf (M. W. Kellogg Co., Jersey City, N. J.). (Paper will be presented by Mr. Wolf).*

The development of this new fluorocarbon rubber was announced in June, 1954, and discussed in a series of papers presented before the Rubber Division in New York City in September of that year. This paper reviews the basic gum properties and the recent findings on the compounding and vulcanization of peroxide and polyamine stocks. The use and effect of various fillers in these compounds is also described. The physical, thermal, and chemical properties of these vulcanizates are discussed. The various methods of fabrication are outlined, including the extrusion of tubing and wire insulation. The results of the most recent functional testing of Kel-F Elastomer mechanical goods are also presented.

4:25 P.M.—21—Polyacrylic Ether-Ester Elastomers. I—The Compounding and Properties of Vyram Polyacrylic Elastomer. *C. L. Gable, H. W. Kilbourne, P. E. McIntyre and M. J. Pugh (Monsanto Chemical Co., Nitro, West Va.). (Paper will be presented by Mr. Kilbourne).*

Compounding and physical properties are discussed for a new polyacrylic ether-ester elastomer which is marketed under the trade name of Vyram. Vulcanizates of the product exhibit outstanding resistance to swell by a wide range of solvents and industrial functional fluids. As a result of increasingly stringent performance requirements, lubricants and functional fluids used in modern aircraft and industrial equipment have become more diversified, and no single fluid is likely to meet all requirements.

It has become quite difficult to provide elastomeric compositions for sealants and packings which will resist the petroleum-base, phosphate ester, chlorinated hydrocarbon, and dibasic acid ester fluids. Vyram acrylic elastomer exhibits excellent resistance to all these fluids, and it may be used for service at temperatures in the range of 10 to 250°F. Several potential end uses, including hydraulic seals and packings, are suggested.

Friday Morning—November 4

General Papers

B. S. Garvey, Jr., Presiding

9:00 A.M.—22—Control of Polymer Breakdown in Oil-Polymer Masterbatches. *W. K. Taft, J. Duke, T. B. Larchar, Sr., W. G. Kitzmiller and M. Feldon (Government Laboratories, University of Akron, Akron, Ohio). (Paper will be presented by Mr. Taft).*

The induction period that an oil masterbatched polymer undergoes prior to its breaking down during aging at 140°F. in an oven seems to be related to the amount of iron required in the polymerization formula. The rate of breakdown can be controlled by adjusting the iron content in the polymerization charges, but the amount of breakdown with the highly aromatic oils was not controlled to the extent sufficient to completely stabilize the

polymers. The amount, time and rate of gel formation were affected also by the amount of iron in the charge.

That the iron is involved has been shown by adding iron to "iron-free" latices to cause breakdowns similar to that obtained with polymers prepared according to a "high iron" formula. Polymers made from charges containing fatty acid soap have been shown to be less stable than those from charges containing rosin acid soaps.

The iron in a polymer made according to a "high iron" formula can be chellated with a suitable agent to prolong the stability of the polymer with and without oil and reduce markedly, but not eliminate except for polymers masterbatched with a highly paraffinic oil, the rate of breakdown, and decrease the tendency of the polymer to gel.

Coagulation of latices with a zinc salt reduced the tendency of the subsequent polymers to break down and aluminum sulfate was more effective in this respect.

9:25 A.M.—23—Correlation of Polymer Breakdown with Absorbency Index. *W. K. Taft, J. Duke, D. Prem and A. D. Snyder (Government Laboratories, University of Akron, Akron, Ohio). (Paper will be presented by Miss Duke).*

The ultraviolet absorbencies of ten oils used for oil-polymer masterbatching where plotted against their concentration in solution with n-heptane or 85/15 methylcyclohexane/ethanol were found to obey Beer's law. When the absorbency indices are plotted against the wavelength, a peak at 260 mμ seems to be indicative of the aromatic reactivity of the oils.

Plotting the rate of polymer breakdown in oil-polymer masterbatches against the absorbency index of the oils yields a graphical pattern that can be represented by two straight lines of different slopes. With some polymers, breakdown was found to be directly related to the "aromaticity" of the oil in the masterbatch as shown by ultra-violet absorption at 260 mμ.

In other cases, there was an acceleration in breakdown apparently directly related to the reactivity of the nitrogen bases and indirectly related to the paraffin content. This added acceleration may depend on the state of oxidation of iron present, since ferrous iron and not ferric iron seems to accelerate the rate of polymer breakdown induced by nitrogen bases. Evidently, certain mixed soaps keep the iron in the ferrous condition and subsequently influence the breakdown of a polymer.

9:50 A.M.—24—A Glass Polymerization Vessel for Small Scale Laboratory Studies. *J. D. Sutherland and J. P. McKenzie (Copolymer Rubber & Chemical Corp., Baton Rouge, La.). (Paper will be presented by Mr. Sutherland).*

There has been a need for a small scale glass polymerizer for laboratory work in the synthetic rubber industry. During the Reconstruction Finance Corporation program considerable work was done at Goodyear Tire & Rubber Co., using pint mason jars as reaction vessels. This type of reactor has many drawbacks which have been overcome in the reactor developed in this laboratory. The essential features of the newly designed unit are as follows:

1. The glass vessel is a half-inch thick Pyrex globe which is available as standard equipment as a globe for explosion-proof lighting fixtures. It will hold a half gallon of material and is capable of withstanding high internal pressures.
2. The agitator is a hydraulically-driven marine type impeller. The seal mechanism in the oil motor acts as a positive seal for the agitator shaft.
3. The reactor contains an internal cooling coil which eliminates heat transfer problems at all reaction temperatures.
4. It has a stainless steel lid which has a vent, a sample line, thermal well and a screw cap which contains a self-sealing gasket.

This type of reactor has been found to be very useful in studying emulsion polymerizations over a wide range of temperatures. It is particularly useful for studying high solids latex systems in which agitation and heat transfer problems are aggravated because of the viscous nature of the latex.

It is of convenient size for use with high cost monomers. Only a minimum quantity of such monomers is required and sufficient finished product can be prepared for small scale laboratory testing.

10:10 A.M.—25—Thermal Degradation of Vulcanized and Unvulcanized Rubber in a Vacuum. *S. Straus and S. L. Madorsky (National Bureau of Standards, Washington, D. C.). (Paper will be presented by Mr. Straus).*

Samples of a high grade of pale crepe rubber, unvulcanized, and also vulcanized in the presence of various vulcanizing ingredients and carbon black, were pyrolyzed in a vacuum at around 370°C. A qualitative and quantitative analysis of the light volatile fractions were carried out in the mass spectrometer, and a material balance of all volatile and non-volatile fractions was made. The characteristic volatile fractions, one volatile at —80°C. and the other volatile at room temperature, consisted mainly of the monomer and dimer, respectively. Vulcanized rubber gave substantially less yield of these volatiles than did the uncured rubber.

Rates of thermal degradation of unvulcanized and vulcanized rubber samples were studied in the temperature range 305 to 325°C. The vulcanized samples were found to degrade at a rate which was on the average 55% higher than for unvulcanized rubber. The activation energies for all rubbers were in the range 56 to 65 kcal. It is concluded, on the basis of this investigation, that any cross-linking which might have been produced in the rubber by sulfur vulcanization, becomes ineffective at the temperature of pyrolysis.

10:50 A.M.—26—Determination of Degree of Cure in Filler-Reinforced Vulcanizates by the Swelling Method. *Gerard Kraus (Phillips Petroleum Co., Bartlesville, Okla.).*

The Flory-Rehner theory of swelling allows an estimate of the number of cross-links in gum vulcanizates. In reinforced rubbers the apparent degree of cross-linking is raised by some fillers, particularly carbon blacks. Some investigators have ascribed this, as well as the related increase in equilibrium modulus, to adsorption of the polymer chains at the filler surface. This interpretation raises the question whether filler contributed linkages should be included in the "degree of cure" of a vulcanizate or whether these constitute an essentially separate reinforcement effect.

It is shown experimentally that at fixed filler loading all physical properties of the vulcanizate are simple functions of the apparent number of network chains as determined from swelling equilibria, regardless of the possible origin of the linkages. Furthermore, aside from controlling the number of apparent linkages, sulfur and accelerator levels as well as cure time have only minor, secondary effects on vulcanizate properties. Comparison of swelling data of gum and black stocks shows that the apparent contribution of the carbon black to cross-linking increases with the level of cure. Softeners and extender oils cause a reduction in the number of linkages, presumably by reducing the efficiency of sulfur utilization.

Results of experiments with various carbon blacks at several loadings suggest strongly that adsorption cannot quantitatively account for the entire apparent black contribution to cross-linking. The evidence points to a combination of effects, including one due to carbon black "structure" and an influence of the black on the efficiency of the vulcanization reaction.

11:20 A.M.—27—Mixing Studies of Zinc Oxide in a Banbury. *H. O. Jones and E. G. Snyder (New Jersey Zinc Co. of Pa., Palmerton, Penna.). (Paper will be presented by Mr. Jones).*

A laboratory scale Banbury mixer operated under controlled conditions has served as a satisfactory tool in evaluating the mixing properties of several zinc oxides in rubber. The total power consumed during mixing was measured with an integrating watt-hour meter while the instantaneous power requirements were recorded by an autographic watt-meter. Other determinations consisted of the measurement of the temperature developed in the batch, position of the ram during various stages of the mixing cycle, and the plasticity of the resultant mixing.

The investigation has included the examination of a densified zinc oxide. In a pelleted form, the zinc oxide has a substantially lower volume per unit weight, occupies a smaller volume in the internal mixer, and thereby enables a greater Banbury output. A combination of surface treatment and densification of the oxide makes possible lower power consumption and better dispersion together with the bulking advantages indicated.

How Humidity Conditioning Minimizes the Margin of Error in Testing Rubber Compounds

By JOSEPH B. O'BRIEN

Application Engineer, Surface Combustion Corporation, Toledo, Ohio

LABORATORY testing of rubber samples has been greatly simplified by the Phillips Chemical Company at its Philblack Plant in the Texas Panhandle by maintaining standard air conditions in the Rubber Evaluation Laboratory. In this room small batches of synthetic or natural rubber stocks, compounded according to industry and government recipes, are subjected to various tensile, viscosity, abrasion and hardness tests to determine the quality of the carbon black produced at this plant. On the basis of these tests carbon black production is accepted.

Rubber compounds are extremely susceptible to small variations in the surrounding air temperature and relative humidity. A few degrees difference in air temperature significantly affects stress values, tensile strength and ultimate elongation. A two percent variation in the sample's moisture content, possible with a few percent increase or decrease in the room's relative humidity, will change tensile strength 200 to 400 psi.

Test results would thus vary widely throughout the country. The U. S. Government originally established optimum values for each test for various compounds, and these values have been generally accepted by the rubber industry. These values were obtained by testing samples at 77°F. and at constant relative humidity. Correction factors, such as those in Table I, are then used throughout the country to compare test results, obtained under varying atmospheric conditions, to the values at standard conditions.

To simplify its test procedures, eliminating to a large degree the margin of error, Phillips Chemical installed a humidity conditioning system to maintain their laboratory at 77°F. ± 3°F. and 35% R.H. This 6 degree temperature spread, in its effect on test results, is within allowable tolerances. Temperature readings after each test and the use of the correction factors are no longer necessary. Considerable time savings have been obtained. The time lag between production, sampling and necessary adjustment of production has been shortened.

TABLE I—TEMPERATURE CORRECTION FACTORS FOR GR-S COMPOUNDS

Temperature (°F.)	Stress at 300% Elongation	Tensile Strength	Ultimate Elongation
55	0.96	0.82	0.91
60	0.97	0.86	0.93
65	0.98	0.90	0.95
70	0.99	0.94	0.97
80	1.01	1.02	1.01
90	1.03	1.10	1.05
95	1.04	1.14	1.07
100	1.05	1.18	1.09

Test Procedures

In the laboratory, carbon black to be control tested is compounded with rubber, frequently with synthetic poly-

FIG. 1—View of the Phillips Rubber Evaluation Laboratory, with the mixing mill at the left.

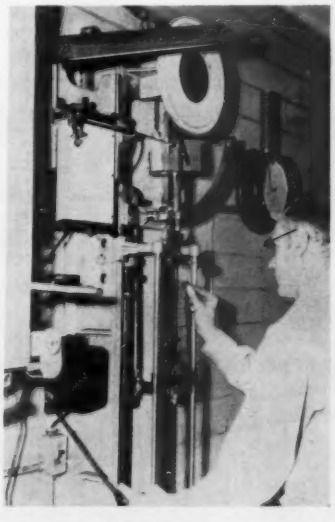


FIG. 2—Samples are tested for tensile and elongation on this Scott Tester at the laboratory.

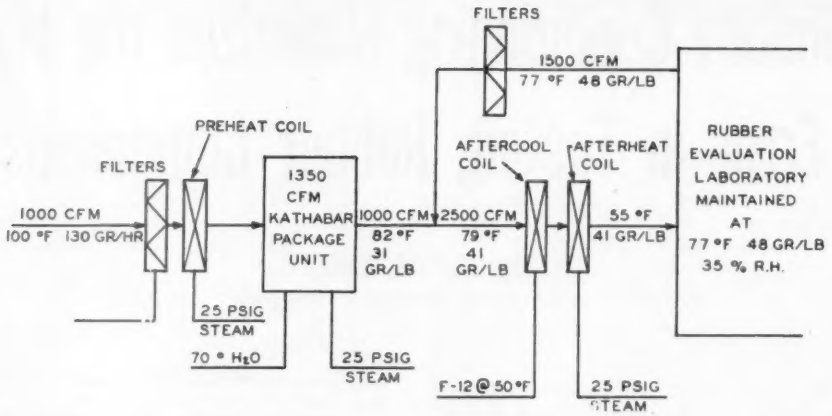


FIG. 3—Flow diagram of the humidity conditioning system at the Borger laboratory based on maximum design conditions.

mer from Phillips' nearby copolymer plant, but occasionally with natural rubber, plus zinc oxide, sulfur, oils and other chemicals, according to established formulas. The mill in the background of Figure 1 is used for this purpose. Prior to use, each of these components has been aged overnight in the room to come to an equilibrium temperature and moisture content. Because of this aging at standard conditions, it has been found that the test results of this laboratory have remained consistent whereas those of other unconditioned laboratories vary widely.

After being thoroughly mixed, a portion of each batch is made into the form of wheels, slabs and pellets. The wheels, after a 45-minute cure, are used in the abrasion tests. The results of these tests provide a complete quality check on over-all production and on each individual reactor.

The pellets, also given a 45 minute cure, are subjected to compression set and hardness tests. These tests provide determination of rate of cure and ability of the black to resist scorch or premature vulcanization.

Tensile strength, ultimate elongation and stress at 300% elongation are determined in the test machine shown in Figure 2. The slabs are cured for various lengths of time—25, 50 or 100 minutes, depending upon the formula.

The results of these tests are interrelated. Abrasion values, for example, increase as the stress values decrease. A complete series of tests thus clearly indicate the quality of the carbon black and whether or not any adjustment or modification of operating conditions may be necessary, before trouble is encountered.

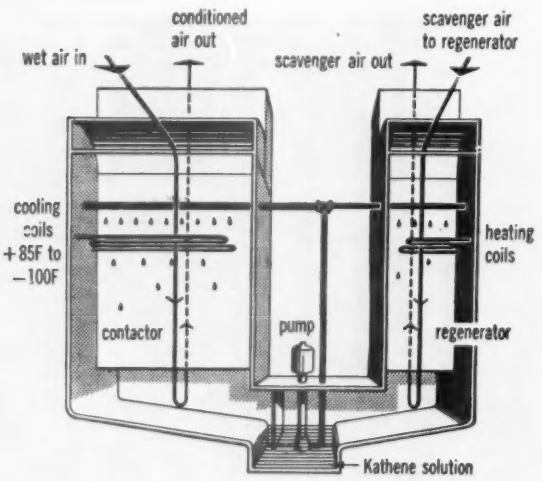


FIG. 4—Cutaway drawing of a Kathabar package unit, similar to that used in the Borger installation. The air washer or contactor chamber is on the left and the regenerator chamber on the right.

Air Conditioning System

The air conditioning system used at Borger combines chemical-type dehumidification and a simple arrangement of heating and cooling coils. A schematic flow diagram, based on maximum design requirements, is shown in Figure 3.

The Kathabar package unit, shown in the cutaway in Figure 4, sub-dehumidifies 1000 cfm of outside air, offsetting the entire 8850 Btu-per-hour latent or moisture load of the laboratory. This unit employs as its dehumidifying medium a chemical solution called "Kathene." The principal constituent of this solution is lithium chloride, a chemical salt. A lithium chloride solution, at a set density, will absorb moisture from a contacting air stream to an extent inversely proportional to the solution temperature. The temperature of the solution is automatically regulated by the temperature and rate of flow of the coolant used in the coils of the contactor section. Water at 70°F. is all that is required in this particular application to effect a reduction from 130 grains of moisture per pound to 31 grains.

Operation of the unit is completely automatic. The air to be dehumidified is drawn into the unit and brought into intimate contact with the absorbent solution. At the same time both pass between the extended surface cooling coils. The excess moisture in the air is absorbed by the Kathene solution, which falls into the sump, and the air is exhausted to the distribution duct. The solution is continuously recirculated back to the contactor section and 10 to 15% is also circulated to the regenerator section. When the solution in the sump reaches a certain

(Continued on Page 135)

Editorials . . .

Government Laboratories

IT is gratifying to note, as reported in the news pages of this issue, that the special 11-member Rubber Commission of the National Science Foundation has apparently decided to give the Government Rubber Laboratories, maintained at the University of Akron, every opportunity to prove its worth before reaching a decision on its eventual disposition. The commission, consisting of six scientists and five non-scientists, is charged with evaluating the future of the government rubber research program and making specific recommendations to NSF by the end of the year. Actually, the Akron laboratories are on a temporary study basis until June 30, 1956.

The Rubber Commission will consider at least four alternatives before determining its recommendations. These are: (1) Outright sale to the highest bidder; (2) Sale or lease to a non-profit organization with the understanding that Defense Department projects would receive priority over all other work; (3) Turning over the facilities to a private research foundation on a lease-sale basis; (4) Retention under government ownership and operation. Each of these alternatives has advantages and disadvantages, and the pros and cons could fill many pages. It is reasonable to assume, however, that national security will be the guiding motif in the final decision.

The commission held its first meeting on September 29. Prior to this meeting, and the organization of the full 11-man group, the National Science Foundation authorized the University of Akron, which operates the laboratories, to arrange two trial research contracts with private companies. The idea behind this authorization was to determine the potential of the laboratory as an independent business organization, with the contracts to be secured on a profit basis level. As a result of the initial meeting of the commission, the University has been authorized to accept additional contracts. These additional research contracts may come from the rubber, chemical or oil fields or from any private company concerned in any manner with the synthetic rubber industry.

The action of the Rubber Commission in this instance is to be highly commended, since it will give the Government Rubber Laboratories a good opportunity to show its real value to industry in general. The facilities operated at Akron are rather unique and were designed for special purpose. The work accomplished to date has more than justified government expenditures and there is little doubt that future results will amply repay any company financing special research projects. Research, unfortunately, can not be rushed, and it is to be hoped that sufficient results on private contracts can be shown before the Rubber Commission must make its final report through the National Science Foundation to Congress.

For the record, just in case there is any doubt, neither the government nor rival companies will be informed on the results of any work conducted at the Laboratories under private contracts. All such work will be treated with the same confidence typical of industry-sponsored research projects at colleges and universities.

Rubber-Stichting

THE recent decision of the Indonesian Government to remove the headquarters of the Rubber-Stichting (Rubber Foundation) from Delft, Holland, to Bogor is to be regretted. Obviously dictated by political reasons, the decision could easily result in the complete liquidation of the splendid research work accomplished to date by the Delft organization. Although staff members at Delft, including Dr. Houwink, the managing director, have been invited to come to Bogor, few of them are inclined to accept the invitation. As a matter of fact, several members of the research staff have already left the organization and have accepted positions with private industry.

There is little doubt that the fundamental study of natural rubber will be continued by the Indonesian Government in some form, but the firm contacts with the European rubber manufacturing industry maintained by the Delft organization will be lost. It is a loss which will keenly be felt by the rubber growers of Indonesia in the long run. Any one who has visited the beautiful building in Delft, has inspected the laboratory facilities and test installations, and has seen the wide range and diversity of interrogatory mail received can best appreciate the esteem accorded the Rubber-Stichting by industry.

The export of natural rubber brings Indonesia an annual income between $400,000,000 and $450,000,000. The Rubber-Stichting is supported by taxes on all rubber exported. The total cost of maintaining the organization is an infinitesmal portion of the total amount involved. The damage to Indonesian rubber growers will be great, particularly since competitive conditions between natural and synthetic rubber are bound to increase with time. It is to be hoped that the Indonesian Government will reconsider its decision before it is too late.

Highlights Sidelights *of the News . . .*

October, 1955

Six bids have materialized from the twenty tenders received by the Rubber Producing Facilities Disposal Commission for the Institute, West Va., synthetic rubber plant . . . Negotiations for purchase of the plant are now in progress and must be completed by December 21 . . . Bidders for the Institute facility include Goodrich-Gulf, Goodyear Synthetic, Imperial Commodities, Edwin W. Pauley, Union Carbide, and United Rubber & Chemical (page 91).

A Federal Court sitting in Washington, D. C., has thrown out an order of the Federal Trade Commission designed to limit quantity discounts in the tire industry . . . The FTC order had sought to fix 20,000 pounds of tires and tubes as the largest quantity upon which a manufacturer could grant his largest discount . . . The Solicitor General of the United States must now decide whether to appeal the case or not . . . The Federal Court decision climaxed more than three years of litigation (page 93).

The eleven-member commission appointed by the National Science Foundation to develop recommendations on the future role of the federal government in basic research on synthetic rubber held its first meeting on September 29 . . . NSF has authorized the University of Akron to arrange trial research contracts with private companies in order to indicate the potential of the laboratory as an independent business unit (page 91).

"Expansion" is now the watchword in the rubber industry with pertinent announcements coming from several companies during the past few weeks . . . Goodyear has announced that it is now in the midst of a two-year expansion program involving the capital outlay of $100,000,000 (page 95) . . . Firestone has approved plans to expand production capacity at the Akron, Ohio, synthetic rubber plant by 35% in addition to a 50% increase at the Lake Charles, La., plant (page 92) . . . Goodrich-Gulf is now studying engineering surveys which may lead to a major expansion of its butadiene and synthetic rubber facilities (page 94).

Goodyear has now introduced its "natural-like" synthetic rubber . . . According to the announcement, the company has succeeded in synthesizing a polyisoprene having a molecular structure very similar to that of natural rubber . . . The new rubber is said to use a catalyst system totally unrelated to other processes previously announced (page 99).

NEWS REPORTS and Industry Activities

BIDDING FOR INSTITUTE POLYMER PLANT ENDS; DISPOSAL COMMISSION CITES GOOD PROSPECTS

BIDDING for the Institute, West Va., synthetic rubber plant officially ended at midnight on October 7 with every indication that the plant would be sold at a price favorable to the government. Spokesmen for the Rubber Producing Facilities Disposal Commission report "spirited competition". The 122,000 long ton facility, long regarded as a "white elephant" for peace-time use, was passed up by private industry in earlier disposals which saw 25 government plants sold to private industry, and another leased. At least twenty tenders were received for the Institute plant by the Disposal Commission from U. S. companies and foreign firms. Under the Disposal Law, the Disposal Commission has until December 21, 1955, to negotiate a sale. The Commission will report to Congress in January and the sale recommended at that time will take effect unless Congress disapproves within a thirty-day period.

Also in the news during the past month was the first meeting of the special eleven-member commission which had been appointed by the National Science Foundation to develop recommendations on the future role of the federal government in basic research on synthetic rubber. The special commission of scientists, educators, attorneys and other experts met for the first time on September 29 in Washington, D. C. It is expected that the commission will deliver its report to the White House in time for the President's budget message next January.

To Arrange Trial Contracts

Meanwhile, the National Science Foundation has authorized Dr. Norman Auburn, president of the University of Akron, Akron, Ohio, to arrange several trial research contracts with private companies. The contracts will indicate the potential of the laboratory as an independent business unit.

One of the prime objectives of the new commission is to determine whether defense rubber needs warrant the continuance of a federally-sponsored research program after June, 1956. Key defense needs include a new synthetic rubber capable of withstanding truck tire wear and rubbers for use in 1000 degree heat in jet aircraft as well as rubbers for use in sub-zero temperatures.

Recently, several major rubber companies have announced the development of new synthetic rubbers which are said to reproduce the molecular structure of natural rubber. These developments, of course, may do much to determine the future need for government research on the same subject, some in the trade believe.

Nearly half the funds alloted to the University, and other basic rubber research projects, is being spent on the synthetic truck tire problem.

Natural Rubber Situation

According to the Business and Defense Services Administration, world natural rubber production totaled 152,500 long tons in July, 1955, compared with 170,000 long tons in July, 1954. For the first seven months of the current year, output was estimated at 1,025,000 long tons, against 995,000 tons in the same period a year ago.

World natural rubber consumption was estimated at 142,500 long tons in July, compared with 130,000 long tons in July, 1954. Consumption in the first seven months of 1955 amounted to 1,087,500 long tons, BDSA estimates, compared with 1,005,000 long tons in the first seven months of the preceding year.

Estimated imports into the Soviet Union and Red China included in these figures were 1,750 long tons in July, 800 long tons in July, 1954, 20,325 long tons in the first seven months of the current year, and 31,500 long tons in the first seven months of the preceding year.

Down 32,500 long tons from the December, 1954, position, world stocks of natural rubber at the end of July, 1955, were placed at 812,500 long tons, consisting of 242,500 long tons in producing areas, 390,000 long tons in consuming areas (excluding Russian and Chinese stocks, and government stocks in the United States, the United Kingdom, and France) and 180,000 long tons afloat.

Excluding Iron Curtain countries, world synthetic rubber operations in July, 1955, were estimated as follows: Production, 90,000 long tons; consumption, 75,000 long tons; end-of-month stocks, 170,000 long tons, down 5,000 long tons from the December 31, 1954 position.

In July, 1954, production was estimated at 53,280 long tons and consumption at 50,000 long tons. In the first seven months of 1955, world output totaled 597,500 long tons, and consumption amounted to 582,500 long tons. In the same period of the preceding year the figures were 404,491 and 422,500 long tons, respectively.

Permalastic Products Expanding

The third major addition in three years to the warehousing and production facilities of Permalastic Products, Detroit, Mich. has been announced by Frank Nelson, president. The newest addition provides 8,000 square feet of space to be used for storage of raw materials and to increase the shipping and warehousing space. The new addition is a one story, completely fireproof structure designed in keeping with the other Permalastic buildings on the nine acre site. In addition to this new building, complete fireproofing has now been added to the company's nearby rubber adhesive plant. The firm is also planning a major expansion on the East Coast. In addition, the research laboratory is also being increased in size and staff.

Six Institute Bids

As this issue went to press, the Rubber Producing Facilities Disposal Commission announced that six bids had been received for the Institute, West Va., synthetic rubber plant. The sixty-day bidding period for the plant closed at midnight, October 7. Proposals to purchase the plant were received by the Disposal Commission from the following: Goodrich-Gulf Chemicals, Inc.; Goodyear Synthetic Rubber Corp.; Imperial Commodities Corp.; Edwin W. Pauley; Union Carbide & Carbon Corp., and United Rubber & Chemical Co. Negotiations have already started on a final contract of sale and must be completed by December 21, 1955.

FIRESTONE PLANS EXPANSION OF SYNTHETIC RUBBER OUTPUT

Harvey S. Firestone, Jr., chairman of the board of the Firestone Tire & Rubber Co., Akron, Ohio, announced on September 29, that the company has approved plans to expand production capacity of the Akron, Ohio, synthetic rubber plant by 35%. This is in addition to a 50% increase in production at the concern's Lake Charles, La., plant, which will bring Firestone's total annual synthetic rubber capacity to more than 190,000 long tons.

Mr. Firestone revealed his company's plans immediately before sailing for Europe and Liberia, West Africa, where he is scheduled to attend the International Rubber Conference for the U. S. State Department. Speaking of the rubber situation before sailing, Mr. Firestone stated: "The future holds a great challenge for the producers of both natural and synthetic rubber. This challenge lies in the constantly increasing, world-wide demand for rubber products. Production of natural and synthetic rubber must be increased if the demands of the future are to be adequately met", Mr. Firestone declared.

Mr. Firestone also revealed that the company has placed a contract for the design and construction of a 40,000 ton butadiene plant. This new plant will supply a part of Firestone's requirements for this important raw material.

World Consumption Increasing

In his pre-sailing statement, Mr. Firestone pointed out that: "During the past decade, world-wide rubber consumption has increased 98% and now is 2,900,000 long tons. Our estimates indicate that by 1965 rubber consumption will have risen to 4,300,000, or approximately 50% more than 1955 consumption.

"It, therefore, becomes apparent that unless production of both synthetic and natural rubbers is substantially increased, the demands of the future will not be met.

"As one of the world's major producers of natural and synthetic rubber, the Firestone company is aware of its obligation to increase production. To that end we are expanding production facilities at our synthetic rubber plant in Lake Charles, La. By next December this plant will be producing 50% above its rated capacity of last April when we purchased it from the Government. And, as I said, we will increase production at our Akron synthetic rubber plant by 35%.

"On our plantations in the Republic of Liberia we have been planting new acreage and replanting old acreage with high-producing clonal stock. Today, we have 90,000 acres in production. We will continue to expand our plantations. We will also continue to assist our Liberian friends who have rubber plantations, or those who wish to develop them, with technical aid and high-yielding stock", Mr. Firestone stated.

"For two years we have been in pilot plant production of a new type of synthetic rubber which duplicates the physical properties of natural rubber. More than 500,000 miles of tire tests proved conclusively that this new type of synthetic rubber has physical properties at normal and high temperatures equivalent to those of natural rubber. All other synthetic rubbers developed up to 1953 were deficient in these respects, the Firestone executive stated.

"The development of this synthetic rubber, which can be used in high-speed truck tires, was the goal of scientists for years. It holds great promise for the future as a rubber that may be superior to natural rubber in many ways and for many uses.

"There will always be requirements for natural rubber provided it is priced competitively with synthetic rubber. This fact constitutes an extra challenge for the producers of natural rubber.

"It was the abnormal rise in the price of natural rubber, earlier this year, that provided the extra spur to expand synthetic rubber producing facilities. It is not inconceivable, what with the great advances made in synthetic rubber, that if the price of natural rubber remains abnormally high it will ultimately price itself out of the market. This much is certain: if the price of natural rubber is not competitive with that of synthetic rubber, the use of the natural product will decline proportionately while the use of synthetic will increase.

"Producers of natural rubber can successfully meet the joint challenge of increasing production and of competition first by replanting with young, high-yielding stock those vast areas in the Far East which have old, low-producing trees. Some acreage has been replanted, but not nearly enough. Second, they should expand the acreage in rubber with new plantings of high-yielding trees. Finally, they should make their operations more efficient by putting into effect every other measure that will increase the yield of producing areas and which will reduce production costs.

"Only in this manner will natural rubber growers share in the future progress of the rubber industry."

PREDICTS INDUSTRY'S SALES IN 1955 WILL TOP $5¼ BILLION

E. A. Luxenberger, vice-president and general manager of the Footwear and General Products Division of the U. S. Rubber Co., New York, N. Y., speaking recently in Los Angeles, Calif., stated that the rubber industry's sales this year will exceed $5,250,000,000, surpassing the $5,000,000,000 record established in 1953.

Mr. Luxenberger was in Los Angeles participating in ground breaking ceremonies for a 90,000 square foot addition to the company's foam rubber plant located at Santa Ana, Calif. Mr. Luxenberger stated that the company is also considering construction of a coated fabrics plant at Santa Ana.

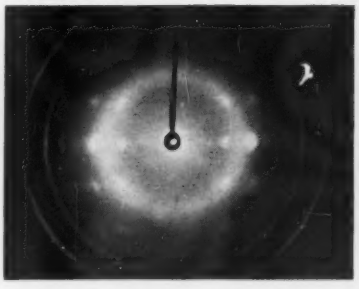
In making his prediction of 1955 industry sales, Mr. Luxenberger stated that tire sales are expected to total more than 100,000,000 units this year, compared with 90,000,000 sold last year and the record of 96,000,000 in 1953. Consumption of new rubber, he noted, will amount to about 1,485,000 long tons this year, a gain of 20% above last year and 11% more than in 1953.

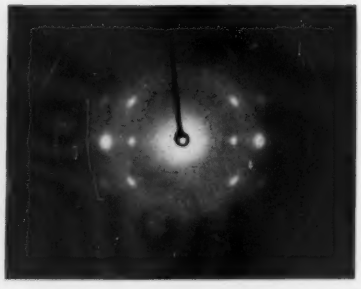
The industry's capital expenditures were estimated at $200,000,000 this year, compared with $131,000,000 in 1954 and $161,000,000 in 1953. The 1955 figure includes $80,000,000 invested in synthetic rubber plants.

Gilbert Joins Naugatuck

Willard S. Gilbert has been appointed a sales representative in the Latex and Lotol Department of the Naugatuck Chemical Division, U. S. Rubber Co. Mr. Gilbert, who just joined Naugatuck Chemical, will make his headquarters in the division's recently opened latex compounding plant in Gastonia, N.C. Mr. Gilbert has more than ten years experience in the development and marketing of latex compounds and chemicals to the textile industry. He is a graduate of Bradford Durfee Technical Institute in Fall River, Mass., and also attended Brown University.

GOODRICH-GULF RELEASES X-RAY PHOTOGRAPHS OF NEW SYNTHETIC RUBBER





Goodrich-Gulf Chemicals, Inc., Cleveland, Ohio, has released the first X-ray diffraction photographs of its new synthetic rubber which has the same molecular structure as natural rubber. The photograph to the left is a crystal pattern of a natural rubber molecule, and the photograph to the right is the Goodrich-Gulf rubber which has been named "Ameripol SN". The achievement, long a goal of world scientists, was accomplished last year by a team of Goodrich-Gulf scientists working in the B. F. Goodrich Co. Research Center at Brecksville, Ohio. Goodrich-Gulf will shortly build a pilot plant in Ohio to produce the new rubber.

FTC DISCOUNT RULING UPSET BY RULING OF FEDERAL COURT

The Federal District Court in Washington, D. C., on September 7, threw out an order of the Federal Trade Commission designed to limit quantity discounts in the tire industry. Judge Alexander Holtzoff heard arguments from opposing attorneys and then ruled against the FTC order. He said its provisions were not in accordance with the Robinson-Patman Anti-Monopoly Law. The decision climaxed more than three years of litigation.

FTC had sought to fix 20,000 pounds of tires and tubes as the largest quantity upon which a manufacturer could grant his largest discount. FTC said the rule was designed to prevent a monopoly in the tire industry and to protect small dealers from being forced out of business by large distributors. The FTC theory behind the order was that large lot discounts give big dealers an unfair price advantage over smaller retailers unable to place such large orders.

Tire manufacturers and the various distributors who comprised the twenty plaintiffs, opposed the rule vigorously. They held that FTC's action was invalid because it was taken without formal hearings and that there was no evidence to support the commission's findings that the industry's pricing practices have promoted monopolies.

They held too, that the ruling would completely change the entire pricing structure of the industry and would bring "irreparable harm to all concerned—manufacturers, middlemen and consumers."

Judge Holtzoff decided the FTC order was legally defective. He emphasized, however, that he was not deciding whether there is a monopoly in the retail tire business, or not. The Judge explained the FTC findings on tire monopoly were not written according to the requirements of the Robinson-Patman Act.

"In view of the importance of the order and its effect on an important industry, the order should not stand unless the statutes are complied with," he said. Officials of the tire firms said they were gratified by the legal victory.

A spokesman for the smaller retailers, however, said that he was confident that the Justice Department would appeal to a higher court. Attorneys for the Justice Department have stated that such a decision would be up to the Solicitor General. They declined to speculate on the possibility of an appeal.

To Offer New Tubeless Line

U. S. Rubber Co. announces that it will soon offer tubeless models in its second line tire, the "U. S. Royal Air Ride." This is the first time that the company has offered tubeless construction in any tires other than those in the 100-level or premium ranges. White sidewalls will also be made available. The U. S. Royal Air Ride tubeless will be made in sizes 6.70-15, 7.10-15 and 7.60-15.

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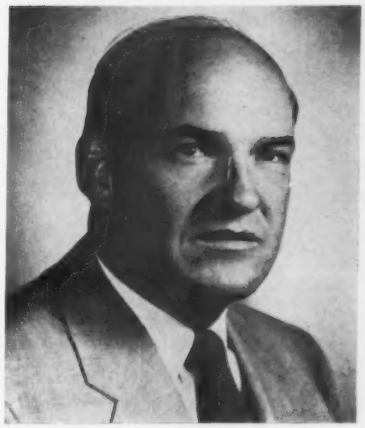
GOODRICH CHEMICAL ANNOUNCES PROMOTION OF NANTZ AND BRODINE



Thomas B. Nantz

Walter E. Brodine

B. F. Goodrich Chemical Co., Cleveland, Ohio, has announced the appointment of Thomas B. Nantz as general manager of plants. Walter E. Brodine has been named to succeed Mr. Nantz as plant manager at Calvert City, Ky. Mr. Nantz was graduated from the University of Kentucky in 1937 with a B.S. in chemistry, and started with the laboratories of the B. F. Goodrich Co. as a chemist. In 1940, he became a foreman and technical man in one of the company's Akron plants, and during the early war years served as technical service manager of the Lone Star Defense Corp. at Texarkana, Texas, which was operated for the government by Goodrich.

Mr. Nantz was transferred to the Louisville, Ky., GR-S plant in 1943, and later was made production manager until 1946 when the plant was sold to Goodrich Chemical. He served as manager of the Goodrich Chemical Hycar nitrile rubber plant in Louisville from 1947 until 1950, when he was sent, as plant manager, to reactivate the government-owned GR-S plant at Institute, West Va. In 1952, Mr. Nantz was made plant manager of Goodrich Chemical's vinyl monomer plant at Calvert City, and in 1953 his responsibilities included the new acrylonitrile plant there. Mr. Nantz is a member of the American Institute of Chemical Engineers and the American Chemical Society.

Mr. Brodine attended Oklahoma A & M and joined Goodrich Chemical in 1943 doing engineering and design work at the Port Neches, Texas, GR-S plant. In 1950, he was appointed plant engineer at the reactivated Institute plant and in 1951 was sent to Calvert City as project engineer for the construction of the vinyl monomer plant. In 1953, Mr. Brodine was transferred in the same capacity to the acrylonitrile plant there.

Stockholders Approve Merger

The merger of Lion Oil Co. into the Monsanto Chemical Co., as agreed upon by the directors of both corporations on July 21, was approved by Monsanto shareowners and Lion shareowners at meetings held in St. Louis and in El Dorado, Ark., on September 23. A joint announcement concerning the vote of both shareowner groups was made by Edgar M. Queeny, board chairman, and Charles Allen Thomas, president, of Monsanto; and by T. H. Barton, chairman, and T. M. Martin, president, of Lion. The merger became effective on September 30. A two-thirds majority of the outstanding shares of both companies was required to approve the merger. Basis of the merger is the exchange of 1½ shares of Monsanto $2 par value common stock for each outstanding share of Lion stock. Messrs. Martin and Barton have become members of the Monsanto board. Lion Oil Co. will be a division of Monsanto. Mr. Martin is to serve as president of the Lion Division and, in addition, he has been elected a vice-president of Monsanto by the Monsanto board. Jeff Davis of El Dorado, vice-president and general counsel of Lion, has been elected an assistant secretary of Monsanto and E. W. Atkinson of El Dorado, vice-president and treasurer of Lion, has been elected an assistant treasurer of Monsanto.

Velsicol Corp. Changes Name

Velsicol Corp., Chicago, Ill., formerly a division of the Arvey Corp., Chicago, has announced that their corporate name has been changed to the Velsicol Chemical Corp. effective immediately. As the company now enjoys its own corporate structure, it is felt that the new title gives a more definite description to its products and industry relationships. At the same time, the company announced the following title changes for executive personnel: J. Regenstein, Sr.—from president to chairman of the board; J. Regenstein, Jr.—from vice-president to president; E. T. Collinsworth, Jr.—from vice-president and general manager to executive vice-president and general manager. Velsicol manufacturing units at Marshall, Ill., and Memphis, Tenn., produce industrial resins, solvents, saturants, chlorine, caustic soda and benzol.

GOODRICH-GULF DETERMINING NEED FOR FUTURE EXPANSION

Engineering surveys are being studied by Goodrich-Gulf Chemicals, Inc., Cleveland, Ohio, that may lead to a major expansion program in the foreseeable future at its butadiene and synthetic rubber facilities at Port Neches, Tex., recently purchased from the U. S. government. This was revealed by S. A. Swensrud, board chairman and W. I. Burt, president, following a director's meeting and inspection of the facilities at Port Neches, Tex.

In the first three months of the company's operations at Port Neches, it was reported, production in the butadiene plant had increased 88% over the like period of 1954. The butadiene plant is jointly operated with the Texas-U. S. Chemical Co., while the synthetic rubber plant is exclusively Goodrich-Gulf.

Both plants are operating at maximum capacity, Mr. Burt said in pointing out the company's present expansion studies to meet the "tremendous increase in national demand for synthetic rubber."

Mr. Burt outlined plans for diversification of activities, and said that the company plans to begin production of latex immediately. "Initially," Mr. Burt said, "we plan to produce approximately 1,000,000 pounds per month. However, we are installing the necessary facilities to triple this amount within the very near future," he added.

Goodrich-Gulf previously announced success in reproducing the true molecule of crude, or tree-grown rubber. Mr. Burt said that although this process was still in the pilot plant stage, and commercial production not yet assured, it is hoped that this discovery will ultimately lead to rubber self-sufficiency of the United States. The U. S. is the world's largest consumer of natural rubber, but it has to import every pound it uses from the Far East, South America, or Africa.

Mr. Burt pointed out that even though the synthesizing of "natural" rubber may one day be commercially possible, it will in no way conflict with the GR-S (or synthetic rubber) industry. "GR-S rubber is a very valuable material and is better for many uses than crude, or tree rubber," he said.

"However, there is an area of usage where crude rubber is the preferred material, apart from the economics of the two materials. Today, natural rubber accounts for about 30% of the total annual tonnage of new rubber consumed in the United States," Mr. Burt asserted.

Flexol Plasticizers 810 And 10-10

"Flexol" plasticizers 810 (a higher alcohol phthalate) and 10-10 (didecyl phthalate) compounded with an antioxidant are now available from the Carbide and Carbon Chemicals Co., New York, N. Y. These plasticizers with the added antioxidant are designated "Flexol" plasticizer 810 and Flexol plasticizer 10-10. Addition of an antioxidant is said to improve the heat aging properties of 810 and 10-10 in vinyl compounds designed for high-temperature use, such as vinyl electrical insulation compounds.

Rubber Band Production Up

The nation's rubber band industry will break all previous records this year, reaching a high of 15,000,000,000 bands if the current production rate continues, according to the B. F. Goodrich Co. Industrial Products Division, Akron, Ohio. The 15,000,000,000 figure is 10% higher than the record set in 1950, or enough elastic bands to circle the earth 28 times, without stretching. The company credits new, ingenious industrial uses of bands for a large share of the increased business. In some shoe factories, for example, all parts necessary to make a shoe are held together by a rubber band as they ride the assembly line. The same is true in some automotive plants where engine valves are banded in pre-counted units. Radio manufacturers use bands around radio tubes to prevent damaging vibration in shipment. Despite the growing importance of bands for industrial operations, the neighborhood newsboy continues to be one of the largest customers for rubber bands, according to the company. In the South and Southwest, each newsboy is said to average about two pounds of bands every month to prevent home-delivered newspapers from becoming wind-blown.

Introduces Nafil Resin

Chase Chemical Corp. of Pittsburgh, Penna., has announced the development of "Nafil Resin" and "Nafil Catalyst" for use in the making of foamed-in-place polyurethane foams. It is stated that when Nafil Resin and Catalyst are mixed together, the resin foams to as much as 30 times its original mass, depending on the density of the foam desired. The resulting material is a tough, fire-resistant, semi-rigid, resilient, cellular foam having many unique and desirable properties. Chase Chemical Corp. says that Nafil material can be applied by spray or pour methods. The foam has outstanding acoustical, cushioning, insulating, sound deadening, and structural reinforcement properties. It is especially useful in the air conditioning, construction, insulating manufacturing, metal working, refrigeration and transportation industries, when a material having one or more of these properties is needed.

To Build Styrofoam Plant

Dow Chemical Co., Midland, Mich., has announced plans for the construction of a new plant at Torrance, Calif., for the production of "Styrofoam", the company's expanded, lightweight, multicellular plastic. Construction is expected to begin shortly and the plant is expected to be in production next January 1. The new plant will be located with other Dow Chemical facilities in Torrance.

PHILADELPHIA RUBBER GROUP HOLDS ANNUAL SUMMER OUTING

The Annual Summer Outing of the Philadelphia Rubber Group was held at the Manufacturers' Golf and Country Club, Oreland, Penna., on August 19th. Heavy rains and flood conditions made the use of the golf course and the swimming pool impossible. However, about 260 members and guests attended the dinner and approximately 140 competed in the golf tournament held at the Oak Terrace Golf Club, Ambler, Penna. After dinner, prizes were awarded to the golf winners and individual prizes were given to all members and guests who attended the dinner.

Lee White (Walker Bros.), served as chairman of the Outing Committee. Mr. White was assisted by Thom Elkins (R. T. Vanderbilt), R. B. Carroll (R. E. Carroll), George Brannan (Columbian Carbon) and Henry Remsberg (Carlisle Tire). The Prize Committee consisted of A. L. Shaw (Goodrich) and Tom Elkins.

Tom Loser (Wyrough & Loser) was in charge of the Golf Tournament and arranged for competition to be held at a neighboring club when the local course became unplayable.

The prize for low gross went to Wes Curtis (Naugatuck Chemical). Mr. Curtis thereby became the first winner of the newly-donated Muehlstein Trophy. There was a tie for second low gross between John Baymiller (Armstrong Cork) and Mr. Basilone, a guest. First and second place high gross winners were John Berg (Alco Oil & Chemical) and Bill Wade (Acme-Hamilton Mfg.). The ten Calloway winners were: the Messrs. Burgess, Rhoads, Boyle, Loosli, Tissari, Rainer, Loser, McCutcheon, Everett and Heckman.

Serugo Sues B. F. Goodrich

Serugo Rubber Co., Akron, Ohio, has filed suit against the B. F. Goodrich Co. for $532,000, charging that latex materials it purchased from the latter company turned out badly in beach balls it makes. Serugo states that it had purchased latex from Goodrich for several years and by January, 1954, had become the country's leading manufacturer of this type of product. Serugo, however, now blames Goodrich for production which went bad early last year. A Goodrich spokesman said that his company contends the latex was the same as ever and that "manufacturing processes must have been responsible for the company's difficulties". Serugo is asking $32,000 for the beach balls which were returned by its customers, and $500,000 for damage to its reputation as a result.

Smith Announces Retirement

With the retirement of Roger H. Smith as vice-president and general manager of the Bridgwater Machine Co., Akron, Ohio, F. A. Buechler, vice-president, has assumed the duties of general manager. Mr. Smith had been associated with the company for thirty-five years. Previous to that time, he was associated with the Kent Machine Co. A native of Boston, Mass., Mr. Smith attended Wentworth Technical Institute in that city.

TWO-YEAR EXPANSION PROGRAM NOW IN PROGRESS AT GOODYEAR

According to P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., the company is now in the midst of a two-year plant expansion and improvement program involving the capital outlay of $100,000,000. Mr. Litchfield said that the capital improvement program involves several new plants in this country and abroad, as well as expansion and modernization of other plants, and of the company's wholesale and retail facilities. Part of the program has already been completed, some is under way, and the remainder is in the approved stage.

The company's forward program beyond the current grouping of projects, said Mr. Litchfield, includes additional improvements and plants which are now in the planning stage, but which are not yet ready to be announced. "We foresee a long period ahead for continued increases in output and sale of our products, and we are making our plans for a considerable period into the future," Mr. Litchfield added.

In the United States, new plants or additions to present factories included in the current $100,000,000 program are being or will be constructed in Akron; Houston, Texas; Jackson, Mich.; Niagara Falls, N. Y., and Litchfield Park, Ariz. New plants abroad include tire factories in Glasgow, Scotland; Colombia and Venezuela.

At Akron, the company will invest $3,500,000 in a capacity increase to the Chemigum and resin plant for the production of nitrile rubbers and latices to fill the increased demand for these raw materials by the rubber, textile, paint and paper industries.

Expanding Research Facilities

Also at Akron, the company is investing $3,300,000 in a new research and development laboratory and other improvements for the subsidiary Goodyear Aircraft Corporation, and a $2,500,000 addition to the capacity of the Airfoam plant where foamed rubber products are produced.

A $4,500,000 addition to the company's tire plant at Jackson, Mich. is now nearing completion. This plant produces original equipment tires for the automotive industry. A total of $6,000,000 will go into expansion of the synthetic rubber plants at Akron and Houston, recently taken over from the government.

Other plant expansions include $500,000 at the company's chemical plant in Niagara Falls, N. Y., and $240,000 for a new aircraft and electronics laboratory at Litchfield Park, Ariz.

Also in the capital improvements program is a multi-million dollar expenditure for equipment changes at all Goodyear tire plants. A major share of this allotment will go into additional "3-T" machines of huge size and exclusive design used in the treatment of fabric for Goodyear tubeless tires.

Foreign operations are likewise being enlarged as the demand for the company's tires and other products grows at a rapid pace. Under the direction of Goodyear—Great Britain, the company's tire and rubber plant at Wolverhampton is being enlarged substantially and the new tire plant in Glasgow, Scotland, will provide production to take care of the rapidly growing volume of business. The company's plants in Luxembourg and Sweden, which produce tires and tubes, will be substantially enlarged.

Expansion and modernization of the company's product distribution facilities includes a $5,000,000 distribution center in the Cleveland area containing 680,000 square feet of storage space. This huge building—almost 23 acres under roof—will service retail outlets in a several-state area, and will eventually be a shipping point for overseas outlets when the St. Lawrence Seaway project is completed.

NATIONAL-STANDARD NAMES NEW REPRESENTATIVES FOR MICHIGAN AND OHIO

Jack J. Gruber

Joseph A. Hand

National-Standard Co., Niles, Mich., has announced the appointment of Joseph A. Hand as district representative for the State of Michigan. Jack J. Gruber has been named to succeed Mr. Hand as district representative in Ohio. Mr. Gruber's territory also includes Kentucky and western Pennsylvania. Mr. Hand, the company's district representative in Ohio for the past seventeen years, joined the firm twenty-three years ago. He will make his headquarters in Detroit. Mr. Gruber joined National-Standard about one year ago. Before joining the company, he had been a manufacturer's representative. Mr. Gruber attended Carnegie Institute of Technology, Pittsburgh, Penna. where he studied business administration.

Webb Named to New Post

Charles E. Webb, assistant to the general manager of the Sharples Chemicals Division of the Pennsylvania Salt Manufacturing Co., Philadelphia, Penna., has been named manager of services at the division's Wyandotte, Mich. plant. His office will be responsible for the purchasing, accounting and office management functions. Albert Malmsten, cost engineer at the Wyandotte plant and formerly assistant to the plant manager, has been named to succeed Mr. Webb. Changes became effective September 1. Mr. Webb, a chemical engineer, joined the Sharples organization immediately following graduation from Kansas State College in 1941. Mr. Malmsten, also an engineer and a graduate of the University of Michigan, has been employed in the Sharples plant since 1948. He was formerly associated with the Ford Motor Co.

Changes at Armstrong Tire

Several changes in technical personnel were recently announced for the Armstrong Tire organization. J. Wayne Perkins has been appointed technical director at West Haven. Ward Fisher has been named technical director at Des Moines. Roy E. Rude is the new technical director at Natchez. Morris M. Miller has been appointed manager of tire compounding at Des Moines.

Mr. Perkins was first employed at Des Moines as a junior compounder and was later transferred to West Haven where he worked in research and development, processing and new products. He is a graduate of Drake University. Mr. Fisher, a graduate of the University of Illinois, has been in research and development at West Haven since 1948 except for a six-month loan to NPA as chief of tire and tube allocations. He was formerly with the B. F. Goodrich Co.

Mr. Rude is a graduate of Southern Illinois University and has a master's degree in chemistry. He started with the Texas Co. as a refinery chemist before joining the Armstrong organization as a chemist at Des Moines. He was manager of rubber compounding at Des Moines prior to his new appointment. Mr. Miller, a graduate of St. Louis University, joined Armstrong as a chemist and has worked in various phases of rubber compounding.

The West Haven plant is operated by the Armstrong Rubber Co., the Des Moines plant by the Armstrong Rubber Manufacturing Co. and the Natchez plant by the Armstrong Tire & Rubber Co.

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DUPONT ELASTOMERS DIVISION FORMS EASTERN SALES DISTRICT

Formation of a new Eastern sales district combining its former New York, Wilmington, and Atlanta districts into a single organization has been announced by the Elastomers Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. The new unit will make its headquarters at Trenton, N. J., the approximate center of its principal area of activity, and establish sub-offices at Charlotte, N. C., and Atlanta to serve industry in the South.

By consolidating and expanding the three districts into a single, larger force, it can provide even better and faster service than before, the company said. Where New York and Atlanta personnel of the Elastomers Division formerly were attached to offices which also served the company's Dyes and Chemicals Division, they will now report directly to Elastomers Division management in Trenton who can devote their entire effort to neoprene, "Hypalon," and the division's line of rubber chemicals.

Similarly, the Chicago district has at the same time been divorced from combined Elastomers-Dyes and Chemical management and set up as a separate unit of the Elastomers Division. However, no change is anticipated in either its territorial bounds or office location.

Samuel W. McCune, III, has been named manager of the new Eastern district, and E. Paul Hartsfield will be assistant manager. Russell A. Kurtz, sales supervisor in Chicago, has been named manager of that district.

Reassigned to New District

All technical sales and development personnel of the three old districts have been re-assigned to the new Eastern district. They are: A. H. Woodward, J. P. Fuller, and R. H. Barton from New York; M. A. Youker, R. S. Graff, R. N. Conklin, and R. S. Griffin from Wilmington; and J. R. Galloway from Atlanta.

Mr. McCune brings the technical, sales and organizational experience of 17 years in the rubber and chemical fields to his new post. Originally from Chicago, he received his bachelor of science degree in chemical engineering from Princeton University in 1938. Following graduation he became a research assistant at Mellon Institute of Industrial Research in Pittsburgh while continuing his studies at Carnegie Institute of Technology.

He joined DuPont in 1940 as a compounder at the rubber laboratory in Deepwater Point, N. J., and was later appointed administrative assistant in Wilmington. In 1951 he became sales supervisor of the New York district, and in 1953 returned to Wilmington to head up sales and development work on "Hypalon" chemical rubber. Early this year, he was named assistant sales development manager of the division as well as sales manager for "Hypalon." With Mr. McCune's transfer to Trenton, responsibility for sales of "Hypalon" has been shifted to H. Logan Lawrence, until now sales manager solely for neoprene.

Mr. Hartsfield, a native of Moultrie, Ga., received his master of arts degree in chemistry from Emory University in 1940.

McCune

Hartsfield

Barnhart

Kurtz

He joined DuPont the same year as an analytical chemist at the Jackson Laboratory in Deepwater Point. Between 1942 and 1950 he was in turn development and control chemist at the company's Chambers Works; on loan as a shift supervisor at the Atomic Energy Commission's Clinton Laboratory; and in development and sales service work at the division's Deepwater Point and Akron rubber laboratories. He was appointed technical sales representative in the Akron district early in 1951, and two years later succeeded Mr. McCune as sales supervisor in New York.

Dr. Kurtz was born in Buffalo, N. Y., and received his Ph.D. from Notre Dame University in 1942. The same year he joined DuPont at Deepwater Point, and in 1947 was named technical sales representative for the Wilmington district. He was appointed technical development representative in the Akron district in 1952, and the following year became sales supervisor in Chicago. Dr. Kurtz is a former director of the American Chemical Society's Division of Rubber Chemistry.

Because of continuing industrial growth in the south, the territory formerly covered by Mr. Galloway will be divided into two, one with a sub-office of the Eastern district in Atlanta, and the other with a sub-office in Charlotte, N. C. The latter will be covered by Roger J. Barnhart, former chemist-compounder at the Deepwater Point rubber laboratory and newly appointed sales representative.

Mr. Barnhart was born in Roanoke, Va., and was graduated from Bridgewater College in 1943 with a B.A. degree in chemistry. He became control chemist for the Solvay Process Co. at Hopewell, Va., and, following two years of service with the Navy, joined DuPont in 1946 as a chemist and supervisor at the Chambers Works. In 1952 he was assigned to the rubber laboratory as a latex compounder, and during the latter half of 1954 served as administrative assistant in Wilmington. Early this year he returned to the rubber laboratory as a compounder in the molded goods section.

The Eastern district's offices will be located at 1750 N. Olden Avenue, Trenton, and are expected to be ready for occupancy in the near future. Andy Melrose, sales correspondent in New York, will become office supervisor in Trenton.

Rubber & Asbestos Corp., 225 Belleville Ave., Bloomfield, N. J., is offering an 8-page, illustrated manual called "Adhesive Bonding". Copies may be obtained by writing to the company.

Flood Clean-Up Progressing

The Naugatuck, Conn., plant of the Naugatuck Chemical Division, U. S. Rubber Co., as of September 30, was more than 80% back in production, six weeks after being hard hit by the flood caused by Hurricane Diane. Completely back in operation are all of the plant's chemical and synthetic rubber production units. Still down are the reclaimed rubber production facilities, which were hardest hit by flood waters that swirled up to ten feet deep through sections of the plant. Clean-up of the reclaimed rubber machinery is being rushed, and this part of the plant was expected to be operating by October 15.

The over-all rehabilitation job after the flood waters receded was a major project. Huge mills had to be torn down, cleaned and reassembled; more than 800 electric motors that ranged up to 750 horsepower had to be dried out and cleaned; an electrical relay control station that was underwater had to be replaced and many damaged floors and walls had to be rebuilt.

Emergency measures are still needed for shipping finished goods and receiving raw materials, since the Waterbury branch line of the New Haven railroad that services the plant has not been completely repaired. Meanwhile, the plant is using a shuttle service of trucks and tank trucks between the plant and a temporary depot on the main line of the New Haven to ship and receive material. The railroad expects to resume service in November.

Improved M-B-T-S Available

Naugatuck Chemical Division, U. S. Rubber Co., has announced the availability of "Naugatuck M-B-T-S," an improved non-dusting powder form with fine particle size. The company states that the fast incorporation feature of Naugatuck M-B-T-S has been maintained, while the ease and thoroughness of dispersion has been improved. Factory scale Banbury mixing of 25% masterbatches in rubber are being made on a regular production basis with very satisfactory results. In one instance where poor dispersion was experienced with a competitive grade of benzothiazyl disulfide, changing to the improved non-dusting M-B-T-S eliminated the trouble, Naugatuck Chemical states. In form, the new material is a white to light-yellow powder. It has been surface treated for non-dusting. It has a specific gravity of 1.5 and a melting range of 155° C. minimum. It has excellent storage stability. Naugatuck M-B-T-S is insoluble in benzol, ethylene dichloride, acetone, water and gasoline.

NEW YORK ELECTS OFFICERS; HEARS HARDESTY AND BORG

The Fall Meeting of the New York Rubber Group held on October 7 at the Henry Hudson Hotel in New York City, featured an election of officers for the 1956 season, and the presentation of several interesting talks. The first of these was entitled "Teflon Is an Engineering Product" and was presented by R. H. Hardesty of the Polychemicals Department, E. I. du Pont de Nemours & Co., Inc. The second paper was presented by E. L. Borg, assistant manager of synthetic rubber development, Naugatuck Chemical Division, U. S. Rubber Co. Mr. Borg spoke on "Synthetic Rubber Today—Five Months After Disposal."

In addition, C. V. Lundberg (Bell Telephone Laboratories), chairman of the Education Committee of the New York Rubber Group, offered a "Report of Program of Course in Elastomer Technology." Approximately 160 members and guests attended the meeting which also included a cocktail hour, dinner, and a program of entertainment.

The following members have been elected to office for the 1956 season: *Chairman*, G. H. Provost (U. S. Rubber); *Vice-Chairman*, Herbert Due (St. Joseph Lead); *Secretary-Treasurer, M. E. Lerner*, (RUBBER AGE). Robert F. McElroy (Harwick Standard) has been elected sergeant-at-arms. The following members have been elected to the Executive Committee for a three-year term: C. L. Ayres (Borne-Scrymser), J. H. Fielding (Armstrong Rubber), Clyde F. Hoover (Pequanoc Rubber), and Max Minnig (Witco Chemical). The Nominating Committee consisted of: A. H. Woodward (Dupont), M. Seventko (Okonite) and R. A. Emmett (Columbian Carbon).

Describes Teflon Properties

In his talk, Mr. Hardesty said that "Teflon" tetrafluoroethylene resin is the heavy-duty member of the DuPont family of engineering materials. It offers a matchless combination of inherent properties which allow it to be engineered to satisfy the needs of a broad spectrum of industrial users.

Teflon is supplied by the Polychemicals Department of DuPont in the form of molding and extrusion powders and as an aqueous dispersion. Processors convert Teflon into such forms as sheets, rods, tubes, tape, and molded products. It can also be obtained in lacquers, enamels, and coated fabrics from the Fabrics and Finishes Department.

Although conventional molding and extrusion techniques for thermoplastics are not applicable to Teflon because of its melt characteristics, it can be processed satisfactorily using a cold-forming operation followed by sintering at temperatures of 720-740° F. The most widely used processing techniques are modified compression molding, ram extrusion through heated dies, extrusion of lubricated powder and calendering, Mr. Hardesty said.

Teflon has outstanding properties which meet the requirements of many difficult applications. It has an exceptionally broad service range from –450 to 500° F. It is completely inert to nearly all chemicals and solvents, being affected only by molten alkali metals, and by fluorine gas under extreme conditions. It has negligible water-absorption, and is unaffected by outdoor weathering. The electrical properties of Teflon are exceptional, particularly since they remain so at high frequencies and high temperatures. A further unusual property is that nothing sticks fast to it. This non-adhesive quality is related to its low coefficient of friction—lowest of any solid in commercial use today.

The major uses of Teflon include high-temperature and high-frequency electrical insulation (motors, generators, transformers, television, radar, etc.), gaskets, packings, mechanical seals, and linings and bearings in chemical equipment, non-adhesive surfaces for bakery rolls, and sealing plates and guides on packaging machinery, Mr. Hardesty concluded.

Mr. Borg, in discussing "Synthetic Rubber Today—Five Months After Disposal," observed that in the five months since the purchase of the government-owned synthetic rubber plants, the consumption of new rubber in the United States has reached an annual rate of 1.65 million long tons. This unprecedented usage, together with a high price for natural rubber, has resulted in a demand for synthetic rubber of the GR-S types in excess of the total assigned capacity of the twelve copolymer plants recently sold by the government.

Increasing Available Quantities

The available quantities of synthetic rubber are being increased in three ways: by the purchase of additional government-owned facilities presently in standby, by operating the privately-owned plants in excess of assigned capacity, and by expansion of these same privately-owned facilities. The supply of synthetic rubber should exceed demand early in 1956.

The quality and uniformity of synthetic rubber under private operation is being held to the same high standards established over the thirteen year period of government production. A subcommittee of the A.S.T.M. is working on the selection of a system of nomenclature, classification, specifications and test methods for synthetic elastomers that will be acceptable to both consumers and producers. No important changes have been made in the common grades of GR-S but the development of new and improved types will be stimulated by competition among the producers, the speaker declared.

SPECIAL NEW YORK GROUP MEETING TO HONOR PINTO AND WILSON

A special meeting of the New York Rubber Group has been planned for Friday, November 18, 1955, at the Henry Hudson Hotel in New York City, to pay tribute to Peter P. Pinto, general manager of RUBBER AGE, and B. Brittain Wilson, general manager of *Rubber World*, who have alternately served as secretary-treasurer of the group since 1936. Messrs. Pinto and Wilson are retiring as officers of the New York Rubber Group at the end of the current year. Mr. Pinto, who is retiring as general manager of RUBBER AGE on December 31, 1955, also served as secretary-treasurer of the New York Rubber Group in 1932 and 1933.

The dinner meeting will be preceded by a cocktail party, courtesy of the New York Rubber Group. The dinner program will include brief remarks by the present chairman and by past-chairmen of the group who have been associated with the retiring officers in activities of the organization. The New York Rubber Group wishes to extend an invitation to the many friends of both Mr. Pinto and Mr. Wilson to attend the special meeting.

The committee in charge of the meeting is headed by M. E. Lerner (RUBBER AGE) and includes R. G. Seaman (*Rubber World*), J. S. Corrigall (R. T. Vanderbilt), M. R. Buffington (Lea Fabrics), and Joseph Breckley (Titanium Pigment). Reservations and tickets for the meeting can be obtained at $6.00 each from either M. E. Lerner, RUBBER AGE, 101 West 31st St., New York 1, N. Y., or R. G. Seaman, *Rubber World*, 386 Fourth Ave., New York 16, N. Y.

Celebrates 40th Anniversary

The General Tire & Rubber Co., Akron, Ohio, marked its fortieth anniversary on September 29, 1955. The company started business on September 29, 1915, with a total capital of $200,000. In celebrating its anniversary, the company announced that its Plastic Division exceeded $50,000,000 in sales for the first nine months of this year, compared with a total of $34,525,000 for last year. General Tire also announced that it has developed a new-textured synthetic rubber called "Hi-Density" which it believes is "the biggest single step to date toward building the 100,000 mile tire for passenger automobiles." It was also announced that the firm's Chemical Division has begun production of paint-latex for interior rubber-base paints and rubber chemicals. Hi-Density is the latest in a series of tire improvements developed by General Tire. It is said that the new product "is a fusion of special quality carbon black with a new formula of wear-resistant rubber." The new rubber is said to combine extra toughness and durability, "so that the tire achieves superior traction in tread while getting more mileage." William O'Neil, president, stated that "General Tire's growth during the past 40 years has been sure and steady. There is every indication in the parent company and its subsidiaries that this growth will continue."

ASME RUBBER DIVISION PLANS INTERESTING CHICAGO MEETING

The November 16th meeting of the Rubber and Plastics Division of the American Society of Mechanical Engineers to be held at the Blackstone Hotel in Chicago, Ill., will be split into three specific sessions—rubber, plastics, and a general session. The meeting is being held in conjunction with the Diamond Jubilee Meeting of the parent organization. Rubber and Plastics Division sessions will take place not only in the morning and afternoon on November 16, but in the evening as well.

The morning session will be devoted to the general subject of rubber and will have as its general theme "Broadening the Applications of Rubber." H. A. Winkelmann (Dryden Rubber) will serve as chairman for this session. He will be assisted by Paul McGervey (Richardson) as vice-chairman. Papers scheduled for presentation at this session include:

"Use of Rubber in Home and Industry: Past-Present-Future" by E. J. Joss, U. S. Rubber Co., Passaic, N. J.

"Use of Rubber in Transportation: Past-Present-Future" by H. H. Waters, Firestone Tire & Rubber Co., Akron, Ohio.

"Engineering Developments in Rubber, July, 1954-August, 1955" by Lillian Cook, Rubber Division Library, University of Akron, Akron, Ohio, and Leora Straka, Goodyear Tire & Rubber Co., Akron, Ohio. (Paper will be presented by Miss Straka).

The afternoon session on November 16 will be a general session and will be devoted to the general theme of "The Rubber and Plastics Engineer in Commerce and Industry". Glen Neely (Richardson) will serve as chairman for this session with Professor Robert Zinn (Northwestern University) as vice-chairman. Papers scheduled for presentation at this session include:

"Education" by C. C. Winding, Cornell University, Ithaca, N. Y.

"Research" by F. E. Reese, Plastics Division, Monsanto Chemical Co., Springfield, Mass.

"Production" by Robert Merrill, U. S. Rubber Co., Detroit, Mich.

"Sales" by Donald L. Gibb, Dow Chemical Co., Midland, Mich.

The evening session on November 16 will be devoted to the subject of plastics, under the theme of Broadening the Application of Plastics". Gordon Kline (Bureau of Standards) will serve as chairman for this session, and C. W. Selheimer (Illinois Institute of Technology) will serve as vice-chairman. Papers scheduled for presentation at this session include:

"Use of Plastics in Home and Industry: Past-Present-Future" by W. E. Manring, B. F. Goodrich Chemical Co., Cleveland, Ohio.

"Use of Plastics In Transportation: Past-Present-Future" by K. K. Fligor, Goodyear Tire & Rubber Co., Akron, Ohio.

"Engineering Developments in Plastics, July, 1954-August, 1955" by Bryce Maxwell, Princeton University, Princeton, N. J.

An index to Volume 77 of RUBBER AGE will be found on Pages 163 to 166 of this issue.

Employment Opportunities

Wright Air Development Center, Wright-Patterson Air Force Base, Dayton, Ohio, is currently in need of chemists and chemical engineers, preferably with experience in rubber compounding or other phases of rubber technology. Those employed will carry the title of "materials engineer" with a Civil Service Rating of GS-7 through GS-12, depending on education and experience. The following are the salaries and general guides used by the Civil Service Commission in establishing eligibility for the various grades available:

GS-7—$4525 per year—B.S. degree and at least six months post-graduate technical experience.

GS-9—$5440 per year—Degree and eighteen months experience in rubber or related fields.

GS-11—$6390 per year — Degree and minimum of 30 to 36 months experience in rubber technology.

GS-12—$7570 per year—At least 4 to 5 years experience with some supervisory experience and preferably with a background of developmental accomplishment.

Those interested in these positions may address their inquiries to E. R. Bartholomew, Chief, Rubber Products Section, Organic Materials Branch, Materials Laboratory, Directorate of Research, Wright Air Development Center, Dayton, Ohio. Please include the office symbol WCRTR-3 on all correspondence addressed to Mr. Bartholomew.

Consulting Services Directory

The Association of Consulting Chemists and Chemical Engineers, Inc., 50 East 41st St., New York 17, N. Y., has announced the publication of the 15th edition of "Consulting Services" (1955). Revised and streamlined, the new edition appears in a new format designed for easy handling. Containing 144 pages, the new edition contains three basic sections. Section I consists of a guide and classifier. This section contains over 200 items of activity with the members specializing or qualifying in the given field indicated by key numbers. Section II describes page by page each member's qualifications and activities. Section III is an alphabetical list of members including much pertinent information as to geographical location, branch offices, etc. Copies of the new edition are available for $1.00 each from the Association.

Planning Arkansas Facility

Sam'l Bingham's Son Manufacturing Co., Chicago, Ill., has announced plans to construct a new plant at Searcy, Ark., for the manufacture of rubber rollers. The plant will be large enough to accommodate about 70 employees. When completed, the new plant will furnish about 25,000 square feet of floor space. The plant will be located on a 10-acre site.

CONNECTICUT RUBBER GROUP HOLDS TENTH ANNUAL OUTING

Approximately 160 members and guests of the Connecticut Rubber Group attended the Tenth Annual Outing held on September 17 at Grassy Hill Park, Derby, Conn. The day's activities included softball, horseshoes, golf and egg-throwing contests. Members enjoyed a buffet-style outing menus served during the day. Prizes were awarded to winners of the various competitive events, and many door prizes were distributed. A portion of the prize money was donated to Flood Relief for the towns of Ansonia, Seymour and Naugatuck, Conn.

James R. Boyle (Armstrong Rubber) served as chairman of the Outing Committee. He was assisted by R. L. Stotz (U. S. Rubber), vice-chairman; H. Gordon (Bond Rubber), treasurer, and G. A. DiNorscia (Goodrich), honorary treasurer. The following members served on the committees noted:

Softball—Vincent Chadwick (Armstrong Rubber), Al Simon (H. O. Canfield), Russ Carlson (Armstrong-Norwalk), and Ralph Robitaille (Phillips Chemical).

Horseshoes — Ray Dudley (Whitney Blake), George Schwenk (U. S. Rubber), and R. Blake (U. S. Rubber).

Golf—George Sprague (Goodrich), W. Curtin (U. S. Rubber), and L. Longworth (Monsanto Chemical).

Egg-Throwing—Carl Larson (Whitney Blake), G. D'Olier (Raybestos-Manhattan), and George Jersolman (Armstrong Rubber).

Greeting—Pat Rooney (General Electric), Otto Lang (K.B.C. Industries), Dave McKean (Whitney Blake), Tom Zimmerman (R. T. Vanderbilt), Tom Fitzgerald (Naugatuck Chemical).

To Install Conveyor System

Hewitt-Robins, Inc., Stamford, Conn., has received a contract to install a series of conveyors and allied equipment in a new uranium plant currently under construction at Tuba City, Arizona, the first uranium plant in the state. The conveyors will haul uranium ore from outside storage areas into the plant, where the element known as U308 is extracted. The extracted material will then be shipped to U. S. atomic energy plants for further processing. The Arizona plant is owned by the Rare Metals Corporation of America, which in turn is owned jointly by the El Paso National Gas Co. and the Western National Gas Co. Rubber belting for the conveyors will be made at the Hewitt-Robins plant in Buffalo. Machinery required to support and drive the conveyors will be made in the company's plants in Passaic, N. J., and Chicago, Ill.

Named Assistant Sales Manager

Henry B. Murphree has been named an assistant sales manager for the U. S. Tires Division of the U. S. Rubber Co., New York, N. Y. In his new position, Mr. Murphree will make his headquarters in New York City. He started with U. S. Rubber in 1945 and rose to the position of southern division sales manager for U. S. tires before his latest appointment.

NEW NATURAL-LIKE SYNTHETIC DEVELOPED BY GOODYEAR TIRE

Research chemists of the Goodyear Tire & Rubber Co., Akron, Ohio, have recently succeeded in synthesizing a polyisoprene having a molecular structure very similar to that of natural rubber, although using a catalyst system totally unrelated to the alkali metal initiator on which Firestone's recently announced process is based. This announcement was made by Dr. Ray P. Dinsmore, vice-president in charge of research and development, on the eve of his address as the Goodyear medalist before the November meeting of the Rubber Division, American Chemical Society.

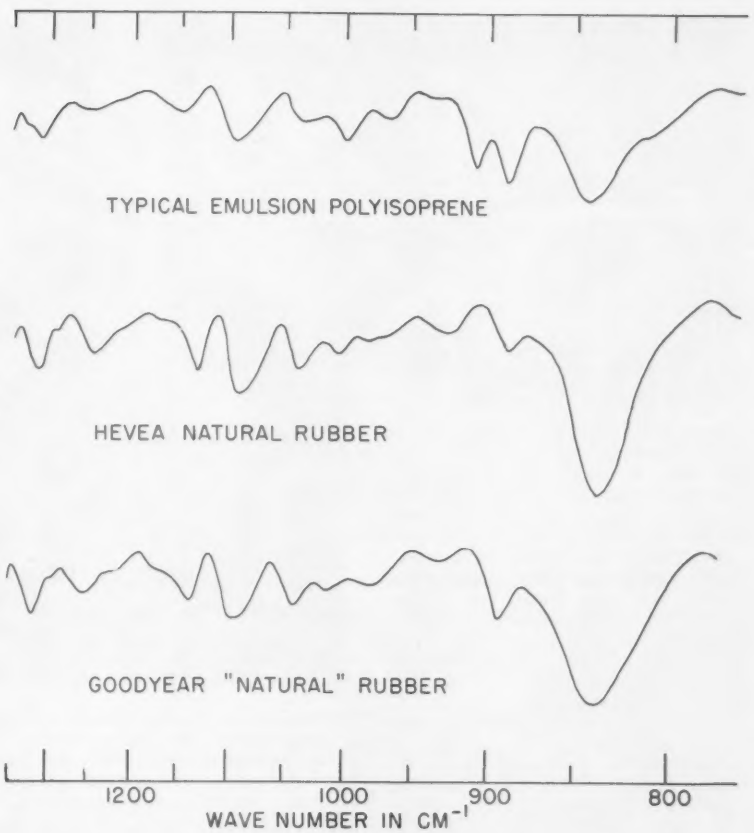
"Our research scientists have found that a heterogeneous catalyst system of the so-called Ziegler type for polyethylene is also effective in producing a rapid solution or bulk polymerization of isoprene," Dr. Dinsmore said. "The catalyst we have used is based on a modification of a method publicized late last year by Professor Karl Ziegler of the Max Planck Institute for Coal Research in Germany, who originally developed it for making high melting point polyethylene. The remarkable result obtained with this catalyst is that the polymer is a nearly all 1,4 cis polyisoprene. This is proved by the infra-red spectrum of the pure, unvulcanized rubber, which is nearly identical with that of natural rubber and quite dissimilar from that of the customary emulsion polyisoprene.

Notes Principal Ingredients

The principal ingredient of the catalyst is aluminum triethyl, which, when mixed with a suitable co-catalyst under precisely controlled conditions, forms a suspension of solid material that appears to offer the necessary specificity of surface for attaining a highly regular structure in the polymer. "Although adequate information with respect to the physical properties and performance of the new product must await the compilation of more extensive tests, we are certain enough of its similarity to Hevea in molecular structure to expect that the most desirable properties of the natural product will be achieved.

"One aspect of this development which has intrigued our chemists," Dr. Dinsmore continued, "is that, notwithstanding the vast difference between our catalyst system and Firestone's, they do have two features in common: each employs a solid surface catalyst and each yields essentially the same molecular structure. This interesting phenomenon has led to speculation that a highly specific surface on which adsorbed monomer polymerizes is the principal role of the catalyst system, with its function as an initiator being secondary. If this is correct, many solid surfaces may be found capable of doing the same job," Dr. Dinsmore said.

Dewey & Almy Chemical Co., Cambridge, Mass., has released two new technical bulletins on "Darex" high styrene copolymers. Bulletin C-17 covers the use of Darex 43G in hard cellular soling, and Bulletin C-18 covers the use of Darex 43G in floor tile.



The above segments of the infra-red spectra provide the "fingerprints" which identify the newly synthesized Goodyear material as being much more closely related to Hevea than to emulsion polyisoprene. The absence of the 910 cm^{-1} absorption band in the Hevea and Goodyear polymers indicate that no structures resulting from 1,2 addition are present in either of these polymers. The relative intensities of the 890 cm^{-1} band show that the concentration of structures in the Goodyear polymer resulting from 3,4 addition is nearer to that of the natural product than to the emulsion polymer. Other features of the spectral region indicate the structure of the Goodyear polymer to be the result of practically all 1,4 cis addition during the polymerization.

Constructing Puerto Rican Plant

Placco Puerto Rico announces that work has commenced on its plant in Catano, San Juan, Puerto Rico. Production will start in mid-January. Placco will manufacture, under license from Pioneer Latex and Chemical Co., Middlesex, N. J., a line of latex, rubber and asphalt products—asphalt roofing and other waterproof and protective coatings, adhesives for the building trade, the shoe trade and the paper bag trade, automobile undercoatings, carpet backings. Placco will have available in bulk storage all of the requisite asphalt penetration grades to supply asphalt road surfacing formulations to any specifications. A Placco plant is already in production in Cali, California, and negotiations are in progress for additional plants in Cuba, Mexico and Venezuela. Placco Puerto Rico will be able to service companies in Puerto Rico, the Dominican Republic, Haiti and the Virgin Islands.

Need a personal file of RUBBER AGE? Use the coupon on Page 161.

Huber Expanding Facilities

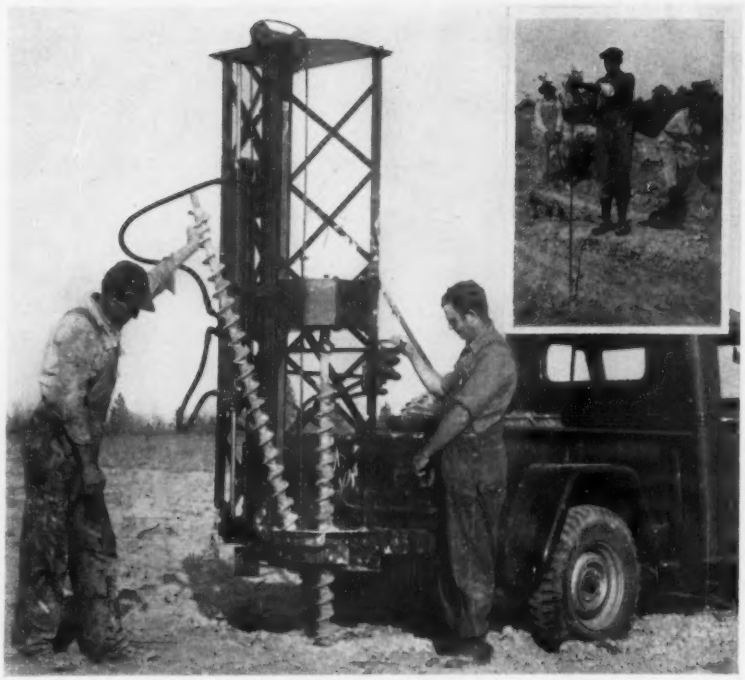
Plans for the construction of a new unit that will increase furnace black production by 15% have been completed by J. M. Huber Corp., New York, N. Y. The new unit will be built at Huber's carbon black headquarters at Borger, Texas. The new unit will have an output of twenty to thirty million pounds of black yearly, depending on the grade produced. This represents an expansion of about 15% in Huber's existing furnace black capacity, company officials said. Huber currently has four furnace black units in operation at Borger and two at Eldon, Texas, in addition to their extensive channel black plant in Borger, Texas. Initial production will be of the SRF (semi-reinforcing furnace) type. This is the second recent expansion of Huber's furnace black facilities at Borger. A new unit has just gone into production and the currently planned furnace plant is expected to be in full production during the latter part of 1956.

FIFTIETH ANNIVERSARY MARKED BY UNITED CLAY MINES CORP.

United Clay Mines Corp., 101 Oakland St., Trenton, N. J., is, this year, celebrating its Fiftieth Anniversary. Founded by George C. Crossley, the company today has assets of almost $2,000,000, and maintains operations in Florida, Georgia, Tennessee, South Carolina and Maryland. Neither the founder nor his early associates are alive today to see the growth of a company that was founded on the idea that fine clays could be found within the continental limits of the United States.

In recent years, the company has entered into an expansion program which has resulted in the installation of what is said to be the largest and most modern clay grinding mill ever to be constructed in the South Carolina area. This mill is scheduled to be in operation in the very near future and when in production will quadruple the present plant capacity, company officials state.

Supplementing the Aiken, S. C., expansion, a complete sand-washing and drying plant is now being constructed at Hawthorne, Fla. The Sandersville, Ga., plant is also the site of a modern and complete washing unit now being installed. Storage facilities are being expanded at the Gleason, Tenn., operation. When the expansion program at this site is completed, 36,000 tons of ball clay will be above ground and available for further processing. Additional milling facilities are also being contemplated at Gleason.



The photographs above depict the "then and now" in company exploration drilling. The inset shows the manner in which exploration drilling was conducted circa 1916. The larger photograph shows the same operation as it is conducted today, using a modern jeep mounted and powered rig.

Diversification of Operations

It has been the policy of the company since 1930 to diversify its operations. As a result, the list of company-owned mines, producing different types of clay for different industries, has increased by one every four to nine years. Today, the company owns mines producing kaolins in Georgia, South Carolina and Florida; ball clays in Tennessee and Maryland. These types of clay supply most of the major users of industrial clays.

Because clay mines are "where you find them," it had often been necessary, in the past, for the company to construct entire villages in those isolated areas where the clay mines were located. Company stores, villages, churches and recreation areas had to be constructed for employees working the mines. Some of the accompanying photographs depict the manner in which clays were mined in the early days, together with more recent photographs showing operations at a later date.

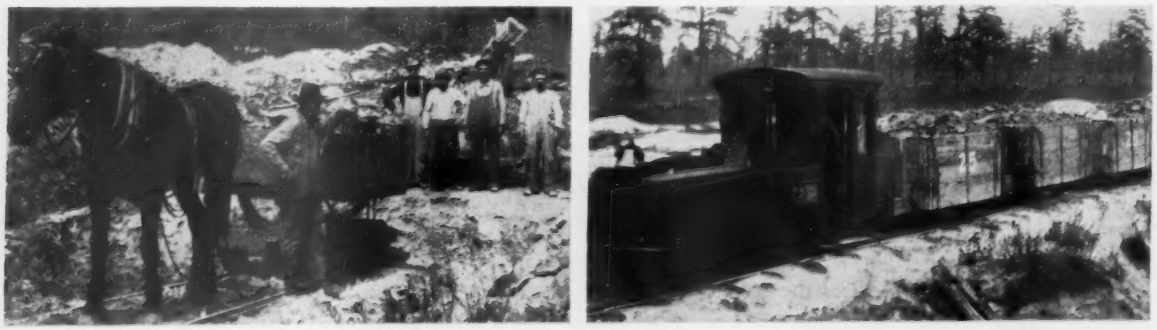
It should be noted that three years were spent by company engineers studying dozens of South Carolina properties covering many thousands of acres before a suitable drill site had been located. Supplementary test borings and the analysis of thousands of core drill samples resulted in "pinpointing" the millions of tons which constitute sufficient clay deposits to justify the development of a mine.

The company recalls that operations in the early days were conducted primarily by hand, with horses or mules furnishing whatever "mechanized" power was required. Haulage for any long distance was generally accomplished by narrow gauge railway to a suitable loading point for further transport via common carrier.

Present day operations are conducted with high-powered bulldozers, pans, draglines and shovels, with transportation to milling sites accomplished, for the most part, by fleets of modern trucks. Company owned villages have given way, by reason of modern transportation, to residential communities from which employees commute to work.

The company emphasizes that through the use of modern methods and modern power machinery a favorable economic climate has been created. This affords users of refined kaolins, for example, quality products at reasonable price, the company notes.

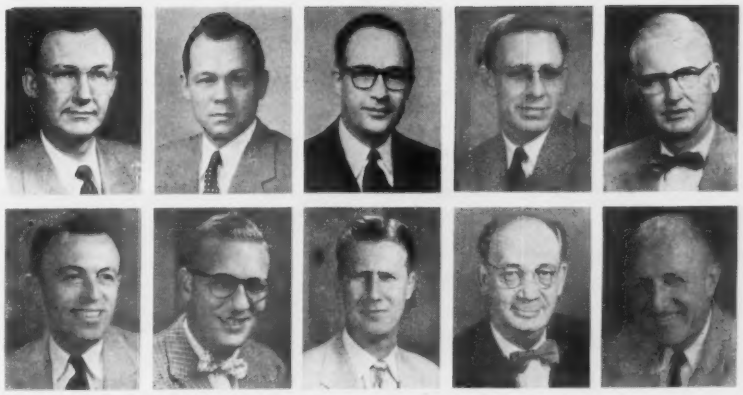
United Clay Mines is now engaged in



Seen, left above, are clay workers and a mule powered rail line which was used to transport clay to a shipping point. This 1909 photograph was taken at the New Jersey operation. The photograph to the right shows how this system had been improved by 1925. A gasoline-powered locomotive is shown hauling cars along the narrow gauge rail line.

the production of clays for many different industries. The company intends to continue this policy of modernization and diversification, with the goal of developing new and better products for the nation's clay consumers.

The following are active with the United Clay Mines Corp. in an executive capacity: B. F. Gentsch, president; G. W. Lee, vice-president and general manager; G. W. Phelps, vice-president and technical director. The sales force includes: Ralph E. Rhodes, sales manager; A. P. Gentsch, eastern and Canadian territory; C. R. Moebus, midwestern territory; J. T. Smith, midwestern territory; Walter F. Smith, Jr., eastern and southern territory; Kenneth E. Ward, eastern territory, and Melvin L. Jontz, West Coast representative.



Seen above are executives and members of the sales staff of the United Clay Mines Corp. Top row, left to right: B. F. Gentsch; G. W. Lee; G. W. Phelps; R. E. Rhodes, Jr., and A. P. Gentsch. Bottom row, left to right: J. T. Smith; C. R. Moebus; W. F. Smith, Jr., M. L. Jontz, and K. E. Ward.

Appointments at Mansfield Tire

Departmental changes involving promotions and newly-created positions have been announced in the Sales, Engineering and Research and Development Departments of the Mansfield Tire & Rubber Co., Mansfield, Ohio. In the Sales Department, John W. Hammer, formerly assistant advertising manager, was named advertising and sales promotion manager succeeding William A. LaValley, who recently was named West Coast division sales manager. Thomas R. Williams, formerly associated with Goodrich, Goodyear and Mohawk Rubber, has been appointed manager of inter-plant relations, a new position. Robert M. Kallgren has been named plant engineer in the office of Paul C. Taylor, director of engineering. He will be in charge of design and lay-out work for Mansfield Tire and associated companies.

Signs Contract With Battelle

G and A Laboratories, Inc., of Savannah, Georgia, manufacturers of "Galex", a non-oxidizing rosin, has signed a contract with Battelle Memorial Institute, Columbus, Ohio, for engineering services in connection with the design, construction, start-up, and operation of a plant to produce the Laboratories' free-flowing form of pelletized stabilized rosin. The plant, to be located at the site of G and A's present Savannah operations, will use the rosin pelletizing process developed at Battelle for G and A. The proposed plant will be designed for continuous operation and will have a capacity of 2500 pounds per hour of Galex pellets. The contract with Battelle is expected to continue for about 10 months with plant operations estimated to commence early in January.

J-M Plans to Split Division

Johns-Manville Corp., New York, N. Y., plans to split its Industrial Products Division into three new operating divisions effective January 1, 1956. The new divisions will comprise a new industrial products group. The move is part of a decentralization program begun in 1946. The new operations divisions in the industrial products group will be the Industrial Insulation Division, the Packings and Friction Materials Division, and the Pipe Division.

Penn-Texas to Acquire Colt's

Penn-Texas Corp. will acquire all assets of Colt's Manufacturing Co., arms and precision metal working firm of Hartford, Conn., under a plan approved by directors of both companies. Stockholders will vote in the near future on the proposal, which involves the exchange of three shares of Penn-Texas $1.60 voting cumulative preferred stock and four shares of Penn-Texas common for each 10 shares of Colt's common stock. The total consideration for Colt's assets would be 120,000 shares of common. Penn-Texas common presently pays $1.40 annual dividends, while Colt's has paid no dividend this year. If the proposal is approved, and the present Penn-Texas dividend maintained, it would give Colt's shareholders the equivalent of $1.04 a year on each share of Colt's stock. Principal purpose of the plan, according to Burton W. Bartlett, chairman of Colt's, is to make available to Colt's the modern facilities and organization of Pratt & Whitney of West Hartford, a subsidiary of Penn-Texas.

Adds to Fremont Plant

A 6,800-square foot addition to the Fremont, Ohio, plant of Hewitt-Robins Inc., Stamford, Conn., has just been completed to provide more space to finish, pack, store and ship die-cut foam-on-fabric for the automobile trade. "The addition will enable us to finish, pack, store, and ship foam rubber slab stock and die-cut parts on a production line basis and is a natural complement to the push button foam compounding and operating units which we now have," according to Ellis B. Gardner, vice-president and general manager of the company's Consumer Products Divisions. Additional die-cutting, packaging and other facilities have been installed to help process the foam-on-fabric as it comes from the push button machines. Die-cut parts will be stored to facilitate shipment of multi-part orders as specified by automobile manufacturers. The new addition faces on loading docks for both rail and truck.

Constructing Marlex Plant

Phillips Chemical Co., wholly owned subsidiary of the Phillips Petroleum Co., has awarded a contract for the major portion of construction work on a 110,000,000-pound-per-year plant to manufacture its new polyethylene plastic discovery, "Marlex", at the company's Adams Terminal chemical manufacturing site on the Houston Ship Channel according to K. S. Adams, chairman, and Paul Endacott, president of both companies. At the same time, the company announced that construction would start at an early date on a sales service laboratory at Bartlesville, Okla., to provide complete facilities for adapting plastics to customers needs, with initial emphasis on Marlex. This laboratory is being constructed concurrently with a new chemical research laboratories building at the Phillips Research Center west of Bartlesville, the company's headquarters.

Phillips had previously awarded a contract for construction of a 120,000,000-pound-per-year plant to manufacture ethylene, the basic petroleum material for Marlex, adjacent to its refinery at Sweeny, Tex. Ethylene will be supplied to the Adams Terminal Marlex plant by a 75-mile connecting pipeline.

Introduces New O-Rings

With the successful formulation of a new synthetic rubber compound, the Parker Appliance Co., Cleveland, Ohio, has announced the availability of aircraft hydraulic service O-rings for the operating temperature range of —65° to +275°F. According to company officials, the new compound was developed expressly to meet unusually rigid functional and physical requirements such as those included in Government Specification MIL-P-18017. The manufacturer, claiming this to be the first compound with such properties, considers it one of the most outstanding developments in aircraft seal compounds in recent years.

Take a long time for this copy of RUBBER AGE to reach your desk? Use the coupon on page 161.

NEW YORK GROUP SPONSORING ELASTOMER TECHNOLOGY COURSE

As briefly announced in the September issue of RUBBER AGE, the New York Rubber Group is presently sponsoring a series of fifteen lectures on "Elastomer Technology." The first lecture of the series was given on October 3rd at the Engineering Societies Building in New York City, where the other fourteen lectures will also be given. Classes are meeting from 7:30 P. M. to 9:45 P. M. on Monday evenings, starting with the October 3rd session.

In general, the course will deal with the history, economics, chemistry and technology of natural and synthetic rubbers as well as polyethylene and PVC. The latter two materials have been rapidly increasing in importance in recent years.

Emphasis will be on the technology involved, but theoretical aspects will be discussed as time permits. Relationships between chemical structure of the various polymers and their chemical and physical properties will be stressed. Aging of elastomers and degradation mechanisms will also be discussed.

The classes and properties of compounding materials will be considered as well as methods of compounding, equipment for compounding, compounding for specific effects and testing equipment and procedures.

The course is designed for persons whose daily work is connected with rubber. For the experienced, it will serve as a review or fill-in course, while for the newer people in the field it will serve as a broad foundation on which to build their future careers in the industry.

Additional Enrollments

As originally planned, and because of limited classroom facilities, enrollment was limited to 125 students. Since the first meeting, however, additional facilities have become available and a greater number of students can now be handled. The fee for the course is $25 for members of the New York Group and $27 for non-members. Interested persons should address C. V. Lundberg, Bell Telephone Laboratories, Murray Hill, N. J. Mr. Lundberg is chairman of the Education Committee of the New York Rubber Group.

The lecture staff has been selected from industry and all are well qualified to speak on their particular subjects. The full program of the course follows:

October 3: Introduction to the Course. Natural Rubber.

October 10: GR-S Type Rubbers.

October 17: Classes and Properties of Compounding Materials for Use in Elastomers.

October 24: Compounding for Specific Effects and Measurement of Specific Properties.

October 31: Reclaimed Rubber. Butyl Rubber.

November 7: GR-S Type Rubbers. Acrylic Ester Copolymers. Silicone Rubber.

November 14: Neoprene. Hypalon.

November 21: No Lecture Scheduled.

November 28: Thiokol. Isocyanates.

December 5: Chemistry of Rubber Vulcanization. Physics of Rubber.

December 12: Polymer Degradation.

December 19: Polyethylene.

December 26: No Lecture Scheduled.

January 2: No Lecture Scheduled.

January 9: Thermoplastic Elastomers: PVC Compounds.

January 16: Latex, Sponge and Foam Rubber.

January 23: Resins and Resins in Rubber.

January 30: Rubber Processing Equipment, Plant Layout, Plant Problems.

Coming Events in the Rubber Industry

Oct. 28. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Oct. 28. Philadelphia Rubber Group, Fall Meeting, Poor Richard Club, Philadelphia, Penna.

Nov. 1. Los Angeles Rubber Group, Statler Hotel, Los Angeles, Calif.

Nov. 2-4. Division of Rubber Chemistry, A.C.S., Fall Meeting, Bellevue-Stratford Hotel, Philadelphia, Penna.

Nov. 3. Rhode Island Rubber Club, Fall Meeting, Pawtucket Country Club, Pawtucket, R. I.

Nov. 10. Northern California Rubber Group.

Nov. 11. Chicago Rubber Group, Furniture Club, Chicago, Ill.

Nov. 13-18. American Society of Mechanical Engineers, Diamond Jubilee Annual Meeting, Hotel Congress, Chicago, Ill.

Nov. 18. Connecticut Rubber Group, Fall Meeting.

Dec. 1. Fort Wayne Rubber and Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Dec. 1. Rhode Island Rubber Club, Fall Meeting, Pawtucket Country Club, Pawtucket, R. I.

Dec. 6-7. Society of the Plastics Industry, Sixth Film, Sheeting and Coated Fabrics Division Conference, Hotel Commodore, New York, N. Y.

Dec. 7. Buffalo Rubber Group, Xmas Party, Buffalo Trap and Field Club, Buffalo, N. Y.

Dec. 9. Detroit Rubber and Plastics Group, Annual Christmas Party, Sheraton-Cadillac Hotel, Detroit, Mich.

Dec. 9. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 10. Southern Ohio Rubber Group, Xmas Party, Miami Valley Golf Club.

Dec. 16. Boston Rubber Group, Xmas Party, Somerset Hotel, Boston, Mass.

Dec. 16. Chicago Rubber Group.

Dec. 16. Los Angeles Rubber Group, Xmas Party, Ambassador Hotel, Los Angeles, Calif.

Jan. 27, 1956. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Feb. 9, 1956. Fort Wayne Rubber and Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Feb. 17, 1956. Chicago Rubber Group, Furniture Club, Chicago, Ill.

Mar. 16, 1956. Chicago Rubber Group, Furniture Club, Chicago, Ill.

Apr. 6, 1956. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Apr. 12, 1956. Fort Wayne Rubber and Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Apr. 27, 1956. Chicago Rubber Group, Furniture Club, Chicago, Ill.

May 16-18, 1956. Division of Rubber Chemistry, A.C.S., Hotel Cleveland, Cleveland, Ohio.

Fort Wayne Hears Burck

The Fort Wayne Rubber and Plastics Group held the first meeting of the 1955-56 season on September 29 at the Hotel Van Orman, Fort Wayne, Ind. Approximately 160 members and guests attended the meeting. Principal speaker at the meeting was Richard C. Burck of the Development Department of the Mobay Chemical Co. Mr. Burck spoke on "Polyurethanes." Mr. Burck illustrated his remarks with slides and a moving picture depicting foreign processing methods.

Ontario Holds Golf Outing

Approximately 115 members and guests of the Ontario Rubber Section of the Chemical Institute of Canada attended the Annual Golf Tournament held at the Dundas Golf and Country Club on September 16. Winners of the different events were as follows: *Low Gross*—W. A. Pursell (Dunlop Canada), R. A. Simpson (Gordon Dockrill), C. Pavanaugh (Goodrich Chemical), and Leo Schmalz (Dominion Rubber). *Low Net*—Harold Deline (Dunlop Canada) and M. McKinsey (R. E. Ferguson). High score for the day was attained by B. Bejode (Gutta Percha & Rubber). Following the tournament, W. J. Nichol (Dunlop Canada) presided at a dinner at which golf and door prizes were distributed. Following the dinner, Mr. Nichol introduced the incoming chairman, W. H. Bechtel (Kaufman Rubber). Arrangements for the tournament were under the direction of C. M. Croakman (Columbian Carbon), assisted by the Golf Committee, which included: Lloyd Lomas (St. Lawrence Chemical); Arthur Luscombe (W. C. Hardesty), and George Johnson (Goodrich).

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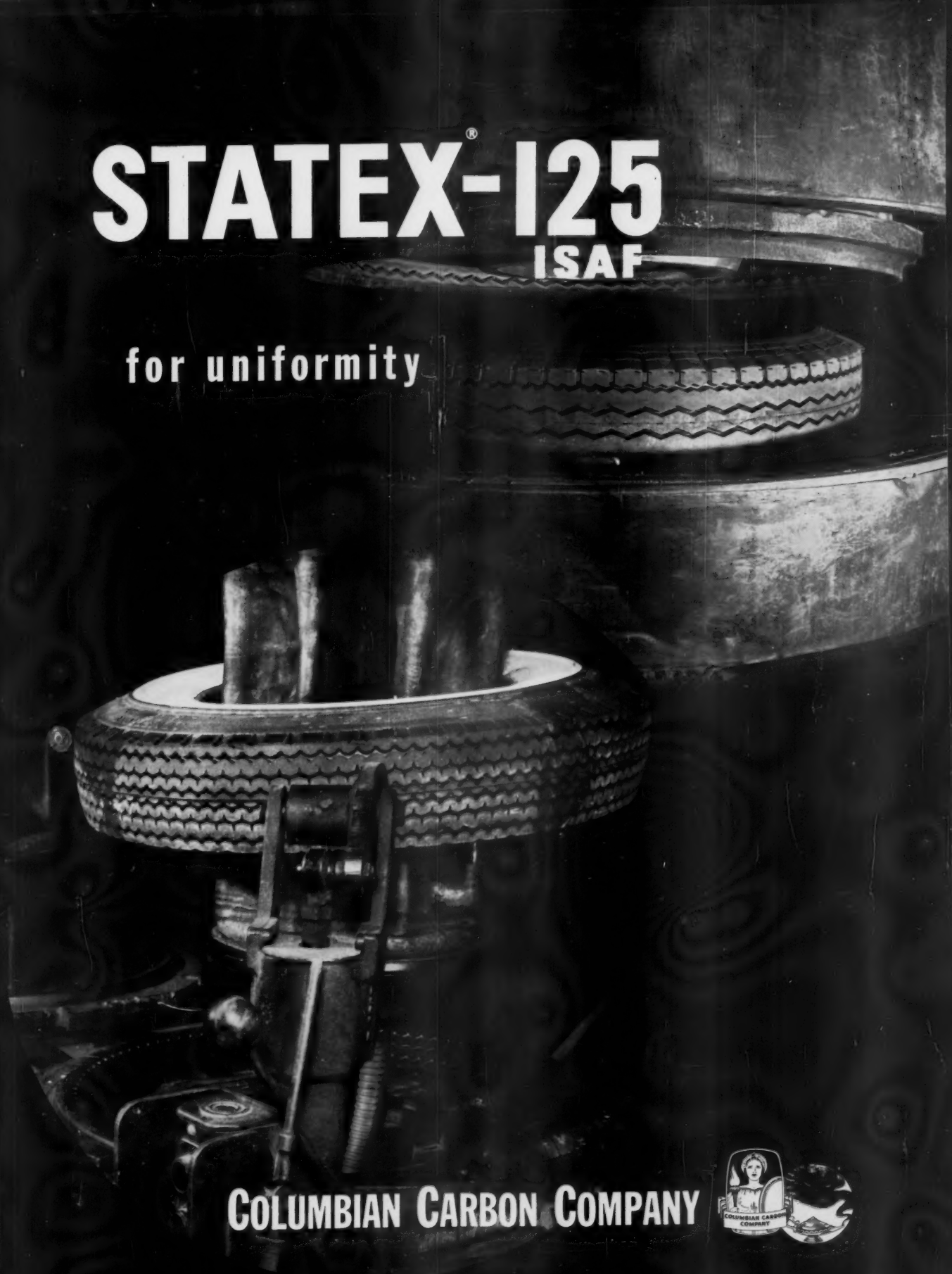

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QM Advisory Committee Meets

Brigadier General C. G. Calloway, Commanding General of the Quartermaster Research and Development Center at Natick, Mass., has announced that a meeting of the Quartermaster Industry Advisory Committee on Insulated Rubber Footwear was held at the Quartermaster Center on September 20. The Industry Advisory Committee, which was nominated by The Quartermaster General, consists of representatives of the rubber footwear and allied industries. Industry advisory meetings enable Quartermaster footwear technologists and industry spokesmen to pool technical knowledge in solving common problems.

Discussed at the meeting were problems such as means of reducing the over-all weight of footwear items, increasing foot and ankle support, and effecting better traction qualities. Also of concern were means of easing the donning and doffing of insulated rubber footwear, an improved closure, and greater carcass resistance to punctures and snags. Problems pertinent to flame resistance, non-wettable insulation, and simplification of production requirements were on the agenda. The views of Committee members regarding the white experimental cold-dry boot which was designed to provide thermal protection down to 65° below zero were solicited. A discussion of the feasibility of designing a practical ventilated insulated boot for use in temperatures ranging from 65° below to 65° above zero brought the meeting to a close.

Thiokol Club Hears Ritchey

The September 15th meeting of the Thiokol Technical Club, held at the headquarters of the Thiokol Chemical Corp. in Trenton, N. J., heard an address by Dr. Harold W. Ritchey, technical director of the Redstone Division of Thiokol. Over 200 scientists and engineers active in rubber and allied industries heard Dr. Ritchey speak on "Solid Propellant Rockets". According to the speaker, solid-propellant rocket motors (such as those manufactured by Thiokol) could even now send a one-ounce object to the moon. Projection of a human being to the moon, at this time, is not feasible, he stated. Dr. Ritchey stated that human space travel is a future possibility with present chemical fuels, but he indicated that nuclear energy would bear the greater potential for this type of project.

Halts Polyethylene Film Output

E. I. du Pont de Nemours Co., Wilmington, Del., will discontinue commercial production of polyethylene film at the end of October, but will continue as a major producer of polyethylene resin, the company announced. DuPont has a relatively small polyethylene film operation at its Yerkes film plant, Buffalo, N. Y., and the company said expansion of its cellophane production will absorb most of the present 30 employees making polyethylene film. DuPont said it elected to discontinue manufacture of polyethylene film in order to accelerate development work in other directions, including new developments in cellophane and "Mylar" polyester film.

Rhodia Appoints Mackie

W. C. Mackie

Rhodia, Inc., New York, N. Y., has announced the appointment of W. C. Mackie as technical sales representative on the Pacific Coast for its aromatic chemicals and "Alamask" industrial reodorants. He has established temporary headquarters in Pasadena, Calif. Mr. Mackie will supervise both sales and engineering in the fields of industrial odor control and abatement and will handle requirements in the perfume, cosmetic, drug, flavor and specialty markets. Mr. Mackie comes to Rhodia with considerable experience, having been associated with the original Albert Albeck, Inc., and, since 1949, with Polak & Schwarz, Inc., where he served in purchasing, laboratory supervision and as sales manager for eleven Western states. He attended the University of California, Los Angeles Branch, where he majored in chemistry, and did preparatory work for a medical degree at Pasadena Junior College.

Named to Mexican Post

Appointment of J. C. Graden, former industrial products development engineer for Goodyear Tire and Rubber Co., Akron, Ohio, to manager of technical service and design of industrial products at the Goodyear-Oxo factory near Mexico City, has been announced by G. K. Hinshaw, vice-president in charge of Foreign operations for the firm. Mr. Graden first joined Goodyear in Akron as a member of the production squadron in 1950 and the following year was transferred to industrial products design, where he remained until his latest assignment. He was born in Florence, Alabama and graduated from the University of Alabama. He is a member of Alpha Tau Omega fraternity and the American Society of Mechanical Engineers.

Durable Rubber Products Moves

Durable Rubber Products Co., has moved its offices and plant to new and larger quarters at 609 West Lake St., Chicago 6, Ill. The company's phone number remains the same: Randolph 6-3322.

Constructing New Annex

Construction is under way of a one-story annex to Phillips Chemical Company's leased three-story office and sales service laboratory building at 318 Water Street, Akron, Ohio, headquarters for the company's Rubber Chemicals Division. The annex is being constructed for eventual expansion to three stories. It will be completed about December 20, 1955. The annex will be 80 by 40 feet and will be used for storage purposes, releasing space in the main building for additional offices and laboratory equipment. The expansion will enable Phillips to render additional services to its customers.

The present three-story building, occupied solely by Phillips, was completed in August, 1953. The first floor is devoted to rendering direct service to customers on technical problems involving application of the company's carbon blacks (Philblacks) and synthetic rubbers (Philprenes). Lynn Harbison is manager of the laboratory. J. F. Svetlik is technical service manager and directs the over-all sales service program. The Rubber Chemicals Division sales personnel occupy the second floor where there is a laboratory for studies of the fundamental structure of carbon blacks and rubber. George E. Popp is manager of domestic sales. The third floor, formerly used for storage, will be converted to office space for additional personnel.

Dravo Expands Services

Expansion of industrial engineering services of the Dravo Corp., Pittsburgh, Penna., through acquisition of the Mill Lubrication Department of the DeLaval Separator Co., Poughkeepsie, N. Y., has been announced. Effective October 1, the DeLaval operations, headquartered in Pittsburgh, will become a part of the Machinery Division of Dravo. The transfer was announced jointly by John K. Beidler, vice-president of Dravo in charge of the Machinery Division, and W. A. McGill, vice-president in charge of sales for DeLaval. Dravo's new Lubrication Section will offer complete design engineering and installation services to the steel, non-ferrous, rubber, paper and other industries requiring specialized lubrication systems. Dravo said that this new activity will complement the company's present services on mechanical construction, piping, pumps and other mill equipment.

Dow Corning Wins Award

Dow Corning Corp., Midland, Mich., has been named winner of the 1955 Award for Chemical Engineering Achievement. The company was selected for the successful participation of its chemical engineers in the commercial development of new products, markets and sales. The award committee also recognized the contributions of Dow Corning's chemical engineers to silicone process research and development. Formal presentation of the award will be made on December 7 at a dinner at the Bellevue-Stratford Hotel in Philadelphia, Penna. The dinner-presentation will be given in connection with the 25th biennial Exposition of the Chemical Industries.

Named Vice-President-Research

Dr. Paul W. Bachman, well-known in the chemical field, has been elected vice-president and director of research and development for the Koppers Co., Pittsburgh, Penna. Dr. Bachman will guide and direct broadly the technical research and development functions of the company, with responsibility for the development of research policies and objectives. Dr. E. W. Volkmann, who has been manager of Koppers Research Department since February, continues in that position. Dr. Bachman was graduated from Johns Hopkins University in Baltimore with a B.S. degree in chemical engineering. Three years later, he was awarded a doctor's degree in chemistry by the same university. While working for his doctorate, Dr. Bachman held a DuPont Fellowship. Later, he worked for a number of years with the General Chemical Co. and the Victor Chemical Co. During his career, he has been associated with the Commercial Solvents Corp. and the Davison Chemical Co. He joined the latter company in 1949 as director of research and development and was made vice-president of research and development in 1952. Dr. Bachman holds memberships in the American Chemical Society, the American Institute of Chemical Engineers, the American Association for the Advancement of Science, the National Association of Corrosion Engineers and the American Petroleum Institute.

Neo-Spangol Plasticizers

Spangenberg-Werke, Hamburg, Germany, has introduced a new series of colloidal plasticizers which find use in both natural and synthetic rubbers. Said to impart many desirable properties to a given compound, some components of the new plasticizers can be subjected to vulcanization, so that there is a tendency during vulcanization to produce a vulcanized form of the plasticizer itself. The company states that the plasticizer then acts as an elasticizing substance, as well as being incorporated in the structure of the final product. The plasticizers are available in two grades. "Neo-Spangol" has an acid number of 41.2; a saponification number of 77.5; an iodine number of 55.3; a specific weight (D_{20}) of 1.08, and a pH value of 7.5. "Neo-Spangol Extra" has an acid number of 41.2; a saponification number of 77.5; an iodine number of 55.3; a specific weight (D_{20}) of 1.06 and a pH value of 7.5, the company states.

Goodyear Promotes Lintala

Promotion of D. E. Lintala to the Organic Research Department of the Goodyear Tire & Rubber Co., Akron, Ohio, has been announced by Dr. H. J. Osterhof, research director. Mr. Lintala, who joined Goodyear in 1942, had been working in the company's Chemical Engineering Department. The veteran chemist is a graduate of Ohio State University where he received a bachelor of science degree in chemical engineering. He is a member of the American Chemical Society and the American Institute of Chemical Engineers.

Stauffer-Consolidated to Merge

In a joint statement issued on September 20, Stauffer Chemical Co. and Consolidated Chemical Industries, Inc., announced that agreement in principle has been reached on a plan of merger of Consolidated into Stauffer. The plan was approved unanimously by the boards of directors of both companies at special meetings held on September 19, and it will be submitted to the stockholders of both companies for their approval.

Speaking for their respective boards of directors, Christian de Guigne, chairman of the board of Stauffer, and George L. Bond, president of Consolidated, said that the plan provides for an exchange of 3¼ shares of Stauffer common stock for each share of Consolidated Class A participating preference stock, excluding the shares of Consolidated owned by Stauffer. If the merger is completed, 698,038 shares of Stauffer common stock will be issued in exchange for 214,781 shares of the Consolidated Class A stock. There are presently outstanding 2,350,240 shares of Stauffer common stock.

Mr. de Guigne also announced that the Stauffer board has increased the quarterly dividend payable on the Stauffer common to 40c a share, payable December 1 to stockholders of record on November 17th. It is hoped that the merger will become effective and the new stock will be issued before the record date. Total assets of the combined companies will be $120,000,000. The Consolidated Chemical Industries operations will be carried on under the name of "Consolidated Chemical Industries Division of Stauffer Chemical Co." No significant changes affecting personnel in either company are contemplated. Stauffer, which holds all of the Class B voting stock of Consolidated, was a prime mover in the formation many years ago of the predecessor companies of Consolidated. The consummation of the merger will solidify the long-standing relationship existing between the companies.

Adhesive For Paper Splicing

A new adhesive for splicing rolls of paper at the printing press, forming splices stronger than the paper itself, has been announced by the B. F. Goodrich Company Industrial Products Division, Akron, Ohio. Known as "R-888-T," the adhesive has an easy-to-brush consistency and is colored red for instant identification. It will not soak through paper, needs no diluting, and will not evaporate or become gummy as quickly as other adhesives when stored in an open container, the company states. The adhesive quality of the new material is long-lasting, and will form a splice as much as 72 hours after application.

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HUBER ASSEMBLES MAMMOTH DRAGLINE AT HUBER, GEORGIA CLAY MINE

A new mammoth dragline, said to be the largest in the state of Georgia, was recently assembled at the Huber, Ga., clay mine of the J. M. Huber Corp., New York, N. Y. The dragline is being used in the company's clay mining operations to strip overburden. Weighing approximately 1,320,000 pounds, the new piece of earth-moving equipment takes about 15 tons of earth per bite in its 9 cubic yard bucket. Twenty-four railroad flat cars were required to ship the disassembled machine and 7,000 man hours of labor to unload and assemble it. Some of the parts weighed as much as 30 tons. The boom is 220 feet long and was shipped in three sections, the longest taking three flat cars. Previously, overburden was removed by power shovels, Euclid wagons and also by scrapers. The new equipment will considerably speed up the procedure and lower costs, the company states.

Mathews Named Chief Chemist

J. P. Mathews

The Republic Rubber Division of the Lee Rubber & Tire Corp., Youngstown, Ohio, has announced the appointment of J. P. Mathews as chief chemist. In his new capacity, Mr. Mathews will assume the duties of A. K. Brill, who held the post of development manager, and who retired on September 1 after thirty-six years with Republic Rubber. Mr. Mathews came to Republic Rubber as a chemist in April, 1926, shortly after graduating from Hiram College. For most of his 29 years' employment, he has worked under the direct supervision of Mr. Brill. He is the senior member of Republic Rubber's Development and Research Department. Mr. Brill first joined the division in 1910 after graduating from the Carnegie Institute of Technology. He left in 1917, returning in 1926 as development engineer. He had been development manager since 1930. Mr. Brill is a member of the American Chemical Society, American Society for Testing Materials, and the Technical Committee of the Rubber Manufacturers Association.

Dayton Tubeless Trailer Tires

Dayton Rubber Co., Dayton, Ohio, has introduced a line of tubeless tires designed specifically for mobile homes. The tires have extra-strong bead construction, the company states, as well as heavier sidewalls to take care of the excessive sway of home trailers. Dayton Rubber will also supply tubeless tires as original equipment for trucks and commercial trailers, company officials pointed out. New facilities for tubeless truck and trailer tire production have recently been installed at the Dayton Rubber plant and are now in operation. Tubeless tires require a single-piece drop-center rim without the customary removable side rings. Because of the need for new rims and wheels to accommodate tubeless tires, the company said that virtually all of Dayton Rubber's initial production would be for original equipment.

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London Symposium Planned

Rubber and Plastics Age, London, England, is holding a symposium on "Flame-Resistant Polymers" on November 23 and 24 at the National College of Rubber Technology, Holloway, London. It is the purpose of this symposium to gather together the information at present available on the subject, and to suggest new applications where flame-resistant polymers may be used to advantage in the interest of safety. The following lectures have been arranged:

"PVC and Related Polymers" by Dr. S. J. Skinner (British Geon).

"PTFE and PTFCE" by Dr. J. Gadsby (I.C.I. Plastics Division).

"Flame-Proofing of Textiles" by F. Tattersall (Proban).

"Chlorinated Rubber" by H. E. Parker (I.C.I. General Chemicals Division).

"Flame-Resistant Rubber—General" by J. R. Phillips (Dunlop) and J. R. Scott (RABRM).

"Neoprene" by H. J. Lanning (Durham Raw Materials).

"Thermosetting Resins" by C. P. Vale (B.I.P. Chemicals).

Additional papers will be announced as soon as titles become available. Those desiring further information about the symposium should contact *Rubber and Plastics Age*, 147 Grosvenor Road, Westminster, London, SW1.

To Construct New Houdry Unit

The first Houdry dehydrogenation process unit to be built in this country since World War II will be constructed near Houston, Texas, by the Texas Butadiene & Chemical Corp. Houdry's single-step dehydrogenation process was developed by Houdry Process Corp., Philadelphia, Penna., during World War II and used in the U. S. Government's synthetic rubber program. Normal butane is processed to produce butenes for aviation gasoline alkylate and butadiene for making synthetic rubber, nylon or other chemical and paint industry products. The new Houdry unit will produce from 17,000 tons of butadiene and 118,000 tons of butenes for aviation gasoline alkylate, to 43,000 tons of butadiene with no production of butenes, according to E. L. Green, Jr., president of Texas Butadiene & Chemical. The unit will be constructed by Fluor Corp., Ltd., and will go into production in early 1957.

Flightex Swatch Folder

Flightex Fabrics, Inc., New York, N. Y., has announced the issuance of a new swatch folder for industrial fabrics and tapes. This new swatch folder shows actual samples of various tapes and styles of fabrics and tapes for industrial use. Included in the folder are fabrics of glass, cotton, vinyon, dynel and orlon. Flightex Fabrics specializes in the manufacture of fabrics and tapes to meet the rapidly changing requirements of industry. The company maintains research laboratories and development facilities to help find the exact fabrics to meet various needs. Swatch folders may be obtained from the company at 93 Worth Street, New York 13, N. Y.

Cabot Promotes Duffy

George J. Duffy

George J. Duffy of Medford, Mass., has been appointed general manager of the Minerals and Chemicals Division of Godfrey L. Cabot, Inc., Boston, Mass. Mr. Duffy will have charge of production and sales of "Wollastonite," "Cab-O-Sil," "Alon," kaolin, charcoal, industrial carbons, and plastic chemicals, and production of pine products. A graduate of Tufts University with a B.S. degree in chemistry in 1937, he joined Cabot in 1940. Working in the laboratory of the Special Blacks Division, Mr. Duffy became manager of that division in 1945. In 1946 he was transferred to Texas in the development and technical service of special blacks. In 1947 he returned to Boston and in 1953 became sales manager of the White Pigments Division of the company.

Double Phthalic Production

Pittsburgh Coke & Chemical Co., Pittsburgh, Penna., will start construction this Fall of a $3,000,000 plant for production of phthalic anhydride. The new plant will double the phthalic anhydride capacity of the company's Coal Chemicals Division, and will be in production by Fall, 1956. Since 1948, when the company's existing phthalic anhydride plant began operating, an extensive research program to improve the manufacturing process and product quality has led to technological advances permitting expansion of the capacity of the original plant and continuous improvement in product quality. The new facilities will incorporate many added improvements in production efficiency and product purity, the company states. The new plant, to be located in Neville Island in the Ohio River below Pittsburgh, is a further step in the chemical phase of an expansion in which the company has invested $34,000,000 since 1947.

Three new games using vacuum-formed rubber-modified styrene have been introduced by the W. H. Schaper Manufacturing Co., Minneapolis, Minn. All are formed from "Campco GM", an impact-resistant plastic produced by the Campco Division of the Chicago Molded Products Corp., Chicago, Ill.

Develops New Wire Tire Cord

A blowout-proof tire for trucks and buses that will outlast the vehicle is now a reality, thanks to a successful research program conducted at the Newburgh Works of U. S. Steel's American Steel and Wire Division in Cleveland, Ohio. Here they have developed a high tensile, specially stranded wire for reinforcing cord. One of the nations leading tire manufacturers has started a widespread promotion of its 300,000-mile tire made with the new wire cord and is predicting that the next two years will see a 500,000-mile tire on the market.

Not to be confused with bead wire, which for years has been used in the core of the bead to hold the tire on the rim, the new cord wire is built into the plies, two to four of which are formed in the carcass of the tire. With a tensile strength of 375,000 to 425,000 pounds per square inch, far in excess of any available fabric cord, wire makes possible a safer, stronger tire with a thinner cross section. This in turn provides greater resiliency and reduces accumulation of heat. The metal-core ply also eliminates casing stretch.

Cord wire is made of high carbon steel and is supplied in coils to the processing line as a hard drawn process wire .033 inches in diameter. This is specially heat-treated in a 30-foot furnace equipped with six lines, each containing a controlled atmosphere. After leaving the furnace, the wire is quenched, acid cleaned and then cold washed prior to electroplating. The brass plating is done in a 30-foot line. After plating, the wire is cleansed in boiling water, dried and then coiled. At this point, it is given a tensile test and is also tested for weight of coating.

The coated wire is then drawn through a series of dies which impart approximately a 97 per cent reduction. One foot of process wire elongates to 33 feet of finished drawn wire which is wound on spools in 140,000 foot lengths. The first step in preparing tire cord is a stranding operation. Three wires are stranded into cord lengths of 22,500 feet. Then seven of the triple-wire strands are layed into lengths of 22,000 feet. After straightening, the cord is ready for use in bus and truck tires.

Rubber-Tired Commuter Trains

Swift, quiet, rubber-tired commuter trains that zip non-stop between Manhattan and outlying towns along smooth concrete channels have been proposed for the New York metropolitan area in an attempt to solve commutation problems. Prepared by a group of transportation experts for the New York-New Jersey Rapid Transit Commission, the new system would be called "Aerial Transit." The trains, in pneumatic tires, would move in concrete runways, on ground level outside the city. The system would take to the air within the city limits travelong on narrow chutes above the sides of major Manhattan artries. It is estimated that the proposed system would cost $1,500,000,000.

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Smaller Tires in Sight

According to current reports, automotive engineers and stylists, in an effort to create a still "lower look," are turning to a tire with a 14-inch diameter in place of the present 15-inch casing. Indications are that at least several makes of 1956 cars will appear on the smaller and "fatter" tires. Most of the 1957 models will utilize the new size tires, it is predicted. Aside from questions of style, the 14-inch tire will also reduce the center of gravity of the vehicle from ⅜ to ½-inch. Reducing the diameter by an inch, however, will create problems for both tire and automobile engineers. The smaller tire needs a smaller wheel and this will cut down the amount of braking surface available. The 14-inch tire is also said to create some problems in stability. There is talk of a wider rim so that casings would be shaped more like a "U" than the present shape which resembles a horseshoe. As the diameter goes down, the cross-section of the tire increases. The most popular size tire in the 15-inch size today has a cross-section of 6.7 inches in width. The comparable tire in the 14-inch size would be 7.1 inches wide. Air pressure remains the same.

To Construct Three-Mile Belt

Hewitt-Robins, Inc., Stamford, Conn., has received an order for a 3-mile conveyor system to move sand and gravel required in the building of a new addition to the Aluminum Co. of Canada plant at Kitimat, British Columbia. The system will consist of 14 conveyors, each 800 to 1,500 feet long, linked together to provide continuous movement of the material from a sand and gravel hill to the plant site. The material will be used as "fill" to raise the site approximately 20 feet and provide proper soil conditions for the addition. The site is approximately 1,600 feet by 3,200 feet. The sand and gravel to be handled will be moved at a rate of about 300 tons per hour. A tripper and boom stacker will be furnished with the conveyors. This equipment will receive the material from the conveyors and stack it in long windrow piles which will then be spread over the area and be impacted to make a sound foundation.

1955 Auto Facts and Figures

Automobile Manufacturers Association, New Center Building, Detroit 2, Mich., has announced the publication of the 35th Edition of Automobile Facts and Figures (1955). The new edition covers some 80 pages of tables, charts and indexes, covering a wide range of subjects relative to motor vehicle production and use. A special feature is a 15-page section devoted to highway subjects.

Win Medical Certification

In a semi-annual report of approved medical services in industry, the Occupational Health Institute recently announced that four companies in the rubber industry have been awarded its Certificate of Health Maintenance. The recognition is given to those plants which comply with the standards for medical service in industry as established and approved by the Industrial Medical Association. The certification program of the Institute gives companies an opportunity to have their medical units evaluated. It enables industrial and business concerns to get an unbiased opinion from a professional group and establishes a yardstick by which management may keep up with the rapid advancements of this specialized branch of medical services.

The Institute has officially accredited 248 medical programs in all sizes of plants and types of industry, throughout the United States, Canada and Hawaii. Plants within the rubber industry that have been certified include: Firestone Tire & Rubber Co., Akron, Ohio, B. F. Goodrich Co., Akron, Ohio; Goodyear Tire & Rubber Co., Akron, Ohio, and the Hood Rubber Co., Watertown, Mass. The standards for certification are adaptable to fit companies ranging from as few as fifty employees to 25,000 or more. The service is free, and each industrial medical unit must be evaluated individually. To apply for a survey leading to certification, companies should communicate with the Occupational Health Institute, Inc., 6 East 39th Street, New York 16, N. Y.

Battelle Completes New Building

The growth of chemical research at the Battelle Memorial Institute, Columbus, Ohio, has been marked by the completion of a new $1,400,000 chemistry building. Seven of the nine divisions of the Department of Chemistry are now housed in the new facility, which totals 98,000 square feet. The new building, which makes about 50% more laboratory space available for chemical research, will afford room for continued growth. The four-story building is 66 by 290 feet with a 66 by 66-foot wing that houses offices and conference rooms. An 11 by 26-foot module was used throughout, with most laboratories being one or two modules in size. Some larger areas for activities such as plastics and rubber processing and for chemical engineering pilot-plant studies are also provided. Special features include constant-temperature-humidity rooms, and an explosion-proof area for polymerization studies on highly combustible materials such as butadiene. In addition to laboratories for organic, inorganic, analytical, and physical chemical research, specialized facilities are provided for plastics, rubber, coatings, paper, leather, and lubricant technologies.

A new 8-page booklet entitled "Questions and Answers on Electron Microscopes" is available without charge from the Research and Control Instruments Division, North American Philips Co., Inc., 750 South Fulton Ave., Mount Vernon, N. Y.

Offering New Tubeless Line

A complete new line of lower-priced tubeless passenger tires, designed for replacement sales, has been announced by the Goodyear Tire & Rubber Co., Akron, Ohio. Known as the tubeless "Super-Cushion", the new product is priced approximately 25% below original equipment tubeless tires. This latest tube-free version of the company's long-established Super-Cushion line incorporates all features of the tube-type Super-Cushion, plus the greater blowout and puncture protection inherent in Goodyear's tubeless construction, according to the company.

Victor Holt, Jr., Goodyear vice-president of tire sales, explained that the new tubeless product is the company's answer to the motorist who wants top quality with utmost economy. "This tire was developed," Mr. Holt said, "for the car owner who desires to replace his tube-type tires with tubeless tires, at lowest cost possible. With the new Super-Cushion tubeless, these changeovers can be made at a cost to the motorist which is even less than many standard tire and tube replacements," Mr. Holt added. He also pointed out the safety features of these tubeless tires, designed especially to withstand the speeds of modern highway driving. Tread design of the new tire is the same popular non-skid rib pattern featured in the tube-type Super-Cushion.

Muehlstein Donates Rare Books

Herman Muehlstein, president of H. Muehlstein & Co., Inc., New York, N. Y., has donated over $100,000 worth of rare books to the University of Akron. At special ceremonies on October 1, Dr. Norman P. Auburn, president of the University, accepted the gift and said that the acquisition would not only enhance the University's academic prestige, but would put the University library past the 100,000 volume mark. Mr. Muehlstein brought with him three books for immediate turnover, among them an Elizabeth Barrett Browning first edition. The others were George Chapman's first edition translation of Homer's "Iliad" and Charles Dickens' first edition of "The Adventures of Oliver Twist." To be turned over upon Mr. Muehlstein's death are 297 other books, including Lewis Carroll's original "Alice in Wonderland." During brief ceremonies on October 1, Dr. Auburn revived the once active "Friends of the University Library" group. Mr. Muehlstein accepted the proffered title of honorary chairman and expressed his happiness at having had the chance to "help start the collection of the next 100,000 volumes."

General Cable to Expand

General Cable Corp., New York, N. Y., has announced plans for building a 50,000 square foot plant at Tampa, Fla., for the manufacture of telephone cables and wires. The company already operates a warehouse and sales office in that city. Construction of the initial unit is expected to begin shortly, with manufacturing to begin in March, 1956. Approximately 125 persons will be employed at the new facility, the company states.

Named to Technical Sales

Harold E. Roth

Harold E. Roth, technologist at the rubber laboratory of the Elastomers Division, E. I. du Pont de Nemours & Co., Inc., Deepwater Point, N. J., has been named technical sales representative and assigned to the division's Akron sales district. Mr. Roth, a native of Akron, received his bachelor of science degree in chemistry from the University of Akron in 1948. From 1942 to 1946 he served as a captain of infantry in Europe. During 1947, while completing his studies, he was employed as a laboratory technician at B. F. Goodrich Co. in Akron. Following graduation he became chief chemist for the Corson Rubber Co., Barberton, Ohio. Two years later he moved to Goodyear Tire & Rubber Co. as a compounder in Airfoam development, later transferring to research on dry rubber and plastics. He joined DuPont early in 1953 as a rubber technologist at Deepwater where his activities have included development and sales service work on diiscoyanates, as well as development of solution coating applications for neoprene and "Hypalon" chemical rubber.

Gillette President Deluxe Tire

A new passenger car tire that maintains traction and skid resistance even when two-thirds worn and which gives 25% more mileage than its predecessor, has been announced by the Gillette Tire Division, U. S. Rubber Co., New York, N. Y. The tire is called the "Gillette President Deluxe" and will be made in tubeless and conventional models with either nylon or rayon construction. Optional white sidewalls are narrower, in keeping with latest style trends. Contributing to the long-mileage feature is the tread design. There are seven ribs proportioned so that each rib carries its full share of the load. The center rib is widest, and the two narrow outside ribs "give" with virtually no squeal on turns. Safety slots almost the full depth of the tread account for the tire's ability to give new tire traction and skid resistance even when the tread is two-thirds worn, the company states.

Take a long time for this copy of RUBBER AGE to reach your desk? Use the coupon on page 161.

Introduces Steel Cord Tires

U. S. Rubber Co., New York, N. Y., has introduced a new line of passenger car and truck tires all containing from one to eight miles of flexible, high strength steel wire. Steel wire, the company said, makes a tire tread rupture proof, doubles cut resistance and eliminates tread cut growth. It also makes a tire run from 20 to 40 degrees cooler, reduces the danger of centrifugal force throwing off treads at high speed, improves high speed riding qualities, and contributes to increased tire mileage. U. S. Rubber states that this marks the first time that a major rubber manufacturer has used wire successfully in a passenger car tire although tire engineers have been experimenting with it for more than 20 years. There are wire truck tires on the market at the present time but they use wire in place of textiles. U. S. Rubber uses wire in addition to textiles. The wire is actually a part of the tread and, therefore, is not subject to the inflation strains found in the carcass. Since it is relaxed, it acts as a barrier to cuts in the tread and protects the carcass from fabric rotting. U. S. Rubber is including wire in its line of six new Royal Master Premium tubeless tires in all passenger car tire sizes. The company is also offering wire in its line of Fleetway and Super-Fleetway truck tires in sizes ranging from 600 by 16 to 1100 by 20.

Now Producing Benzonitrile

Tennessee Products & Chemical Corp., Nashville, Tenn., has announced that developmental quantities of benzonitrile are now being produced at the company's Chattanooga, Tenn., pilot plant under a new process developed at the research laboratories. Pilot plant operations to date indicate that benzonitrile can be produced in commercial quantities at prices that would permit large scale use by many industries, the company said. Benzonitrile, latest addition to the firm's list of organic chemicals, is adaptable for use by a wide range of chemical process and other industries, including rubber, plastics, organic synthesis, pharmaceutical, textile, leather, synthetic coatings and solvents. Developmental quantities of benzonitrile now being produced at Tennessee Products & Chemical's pilot plant will be allocated to interested industries for experimental purposes.

Personnel Shifts at Goodyear

Five personnel changes involving the creation of two new positions in the Film and Flooring Division have been announced by the Goodyear Tire & Rubber Co., Akron, Ohio. J. D. Long, former films and flooring district manager in Cleveland, and A. F. Thomas, who held the same position in Chicago, have been promoted to the new posts of Eastern and Western division managers, respectively. Also announced were the appointments of K. J. Whisler, former films and flooring district manager in Dallas, to the same post in Chicago; C. E. Hixson, formerly on the Pliofilm sales staff, to the district manager post at Dallas, and K. L. Weeden, former manager of the Flooring Sales Department, to district manager in Cleveland.

Names in the News

PAUL R. GIBSON, associated with the American Viscose Corp. since 1922, has been promoted to technical assistant to the plant manager at Parkersburg, West Va.

ERWIN J. CAMPBELL has been appointed supervisor of process research in the Research and Development Department of the Acheson Colloids Co., Port Huron, Mich. He has been with the company since 1945.

HERBERT SCHOENFIELD, formerly associated with the Velsicol Corp., has rejoined the Emulsol Chemical Corp., Chicago, Ill., as manager of technical sales service.

LEWIS PEABODY, sales representative for Stein, Hall & Co., Inc., New York, N. Y., was recently honored at a testimonial dinner marking his completion of 40 years service with the company.

PAUL BOGNER has been assigned to the Chicago district sales office of Emery Industries, Inc. He will handle all Emery chemical products including fatty acids and derivatives, plasticizers and textile oils.

R. ARTHUR GAISER, formerly associated with the Libbey-Owens-Ford Glass Co., has been named director of research and product development for the Ball Brothers Co., Muncie, Ind.

HARVEY S. FIRESTONE, JR., chairman of the board of the Firestone Tire & Rubber Co., has been named national chairman of Brotherhood Week, sponsored by the National Conference of Christians and Jews. Brotherhood Week will be observed next February 19-26.

T. P. BERINGTON, associated with Monsanto Chemicals, Ltd., London, Eng., since 1929, has been elected vice-chairman of the company.

MILO J. MARSH, executive vice-president of the Ohio Rubber Co., Willoughby, Ohio, served as chairman of the American Management Association workshop seminar which was held in New York City on October 3 to 5.

HERMAN LIBKIND, until recently associated with the Western Insulated Wire Co., has joined the MacClatchie Manufacturing Co., of Compton, Calif., as superintendent of rubber operations.

WALTER H. BIERINGER has been appointed general sales manager of the Plymouth Rubber Co., Canton, Mass.

L. B. TEWKSBURY, formerly associated with the Wichita Foundation for Industrial Research, has joined the Diene Synthetic Rubbers Section of the Goodyear Tire & Rubber Co., Akron, Ohio.

WILLIAM E. CLARK, vice-president of the U. S. Rubber Co., has been named chairman of the Rubber Division of the United Hospital Fund's 76th annual fund raising appeal.

WILLIAM H. DAVIS, JR., formerly associated with the Monsanto Chemical Co., has been named director of sales development of the Petro-Tex Chemical Corp. with headquarters at Houston, Texas.

JACK A. FLETCHER, formerly associated with the National Electric Products Co., Pittsburgh, Penna., has joined the Spencer Chemical Co., Kansas City, Mo., as technical service representative, industrial chemicals, specializing in wire and cable insulation.

GUY GUNDAKER, JR., field sales manager for the Tire and Equipment Division of the B. F. Goodrich Co., Akron, Ohio, was recently honored by the company and presented with a watch on his completion of thirty years' service.

CLARENCE L. ZEISE, JR., formerly associated with the Goodyear Tire & Rubber Co., has joined the Armstrong Cork Co. as a chemist. He will be stationed at the company's research and development center in Lancaster, Penna.

BERNARD B. REINTZE has retired as chief chemist of the Okonite Co., Passaic, N. J., after 39 years of service. Mr. Reintze will do consulting work on high voltage cables.

GEORGE W. BLUM, previously an associate professor of chemical engineering at the Case Institute of Technology, has joined the chemical engineering staff of the Goodyear Tire & Rubber Co.

P. S. BRALLIER, associated with the Stauffer Chemical Co., New York, N. Y., for almost 40 years, has been named technical advisor to the president. A. N. WOHLWEND, formerly sales development manager, has been named to succeed Mr. Brallier as director of market research and development.

HOWARD SHANNON, associated with the American Hard Rubber Co. since 1940, has been named vice-president and general manager of the Supplex Corp., Garwood, N. J., an American Hard Rubber subsidiary.

K. O. WILLIAM SANDBERG has been named manager of the custom molding plant of the Plastics Division, General Electric Co., Decatur, Ill.

OLIVER NUSSLOCK, associated with the N. L. Kuehn Co., Milwaukee, Wisc., since 1946, has been appointed sales manager.

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Susie Named to New Post

Dr. A. G. Susie

Dr. A. G. Susie has been named acting technical superintendent for the Baytown, Texas, synthetic rubber plant of the United Rubber & Chemical Co., Charleston, West Va. United Rubber & Chemical is a subsidiary of the United Carbon Co. For the past year and a half Dr. Susie has served as United Carbon superintendent of research at the company's executive headquarters in Charleston. Widely experienced in rubber chemistry, Dr. Susie formerly was senior scientist with the Armour Research Foundation in Chicago, Ill., and earlier served as head of the Foundation's Plastics and Rubber Section. A chemical engineering graduate of Ohio Northern University, he holds a master of science degree from Toledo University and was awarded the degree of Doctor of Philosophy at Purdue University in 1939.

From 1932 to 1936, after completing his undergraduate studies, he was a chemical engineer for the Sun Oil Co., and at Purdue was a holder of an industrial research fellowship. From 1939 to 1945 he was a research chemist for Gustavus J. Esselen, Inc., of Boston, Mass., and from 1945 to 1949 was chief chemist for the Marbon Corp. at Gary, Ind. Dr. Susie is the holder of several patents, the author of a number of scientific papers, and is a member of the American Chemical Society.

DR. ISAAC DROGIN, vice-president and director of research of the United Carbon Co., Charleston, West Va., addressed the October 10th meeting of the Eau Claire Technical Society at Eau Claire, Wisc., on the subject, "Developments in the Carbon Black Industry."

RICHARD Y. CASE, chief engineer of the Power Transmission Department of the U. S. Rubber Co., will receive the Edward Longstreth Medal of the Franklin Institute on October 19. The award recognizes Mr. Case's invention of the timing belt, a rubber and fabric belt with teeth that engage with grooved pulleys, producing a positive drive independent of frictional grip.

Adhesive Products Corp., New York, N. Y., has announced the development of "Griptex", a double-strength adhesive for the manufacture of stitchless belts.

Latex-Coated Rayon Cloth

A thin coating of synthetic rubber latex increases the wearing qualities of rayon cloth more than four times without dulling the cloth's bright colors in a new process developed by Poughkeepsie Finishing Corp. of Paterson, N.J., in conjunction with Midland Textiles Inc. of New York, N.Y. The special synthetic resin latex is made and compounded by the Naugatuck Chemical Division of the U. S. Rubber Co. The latex is applied to the reverse side of the cloth. It is a permanent coating, not affected by chemicals used in the finishing operation or by cleaning fluids. The individual fibers in the cloth are locked together by the coating. This steps up the cloth's abrasion resistance four to five times. It also increases seam strength, important in sewing, and prevents ravelling and fabric slippage at the cloth edges. The stiffnes or "hand" of the fabric is also increased, permitting thin fabric to be used for heavier jobs. But the coating is not air-tight. The cloth is still porous and so can be used in upholstery work where a fabric that "breathes" is needed. Nor does the coating give the cloth an odor. Smooth-surfaced fabrics in plaids, dobbies, stripes and solids, woven from multifilament rayon by Midland Textiles, are now being coated with the new process. In no case has the lustrous color in the cloth been diminished by the coating. The coated cloth is now being used in automobile seat covers. It is also being tested in furniture covering.

Closes Chicago Die Mold Plant

U. S. Rubber Co., New York, N. Y., has completed transfer of its plastics molding equipment from its Chicago Die Mold plant to the Fort Wayne, Ind., plant, where more adequate facilities to accommodate its rapidly growing molded plastics business are being made available. Operations at Chicago have been discontinued. Larger molding presses will be added to the present facilities for molding products by the injection, compression, transfer and plunger methods. U. S. Rubber acquired the Chicago Die Mold Co. in 1951. Expansion followed as raw materials made by the rubber company were brought in and new processing techniques were introduced. By 1954, it became necessary to shift the manufacture of plastic pipe to the modern Fort Wayne plant. Continued growth made the facilities at the Chicago plant wholly inadequate. Besides plastic pipe and fittings, products include parts for electrical appliances, industrial parts, household devices, photographic equipment, packaging for food, pharmaceuticals and cosmetics, and military parts.

New Assignments at Emulsol

Solomon Epstein, executive vice-president of the Emulsol Chemical Corp., has been assigned the duties of general manager of the company. Emulsol Chemical is a division of the Witco Chemical Co., New York, N. Y. It has also been announced that Dr. Charles Fuchs, formerly chief chemist of Emulsol Chemical, has been elected vice-president in charge of research and development.

Caire Joins Thiokol Chemical

Eligio J. Caire

Eligio J. Caire has joined the Thiokol Chemical Corp., Trenton, N. J., as a technical sales representative. He is now engaged in selling Thiokol's polysulfide liquid polymers, plasticizers, oil- and solvent-resistant synthetic rubbers, and the new "Thiokol" VA-7 liquid aliphatic vulcanizing agent. Mr. Caire was formerly with the Plastic Division of the Ciba Co., doing technical service and laboratory research work involving the use of epoxy resins in industrial applications. He majored in science and mathematics at the New Jersey State Teachers College at Jersey City, and obtained his B.A. degree at Wagner College, Staten Island, New York.

1955 Tire Shipments

Tire shipments this year in the United States will exceed 105,000,000 units, an increase of 11% over 1954 total tire sales, according to estimates made by the B. F. Goodrich Co., Akron, Ohio. Tires for new automobiles, and for replacement, are expected to total 87,000,000 this year, about 9,000,000 more than were sold in 1954, the company's survey shows. Sale of truck and bus tires will also pass 1954 totals by about a million units, totaling about 13,400,000 tires this year. Tractor-implement tire sales will top 3,500,000 units this year, and industrial pneumatic tire sales will be more than 1,200,000, both totals representing increases over 1954. Airplane tires, adding up to an estimated 485,000 units, brings the B. F. Goodrich estimate for the year to more than 105,000,000 units.

Simplex Wire Enlarging Plant

Simplex Wire & Cable Co., Cambridge, Mass., is now building a 100,000 square foot addition to its plant at Newington, N. H. It is estimated that the new addition will cost $1,000,000. The building is the second added since the plant opened in October, 1953. The company states that increased orders for submarine cable made the expansion necessary.

Installs 75-Inch Bag-O-Matic

The installation of twelve 75-inch "Bag-O-Matic" presses, said to be the first of their kind to be installed in any company in the rubber industry, has been announced by Frederick Machlin, president of the Armstrong Rubber Co., West Haven, Conn. Valued at approximately half a million dollars, the modern equipment specially built to cure tires up to size 18.00/25, is now curing tires in the company's West Haven and Des Moines, Iowa plants. According to President Machlin: "We at Armstrong are alert to the fact that the best, most modern, most automatic equipment is essential in building a better quality tire. The installation of the new 75-inch Bag-O-Matics, another first in Armstrong's ever-expanding research and development program, substantiates the fact that Armstrong is in the foreground, continually moving ahead to manufacture products which will meet future requirements." Automatically controlled, these new Bag-O-Matics, weighing 72,000 pounds each, will be used to cure airplane tires as well as large earthmover, tractor and truck tires. The curing process in these presses is identical to that of the recently installed 55-inch dual Bag-O-Matics, the length of the cure varying with the type of tire.

Super Champion Tubeless Tire

A new tubeless tire priced less than the 100-level tubeless tires that are original equipment on new automobiles and built with the same puncture protecting safety liner as is in premium tires has been announced by The Firestone Tire & Rubber Co., Akron, Ohio. The Firestone "Super Champion" tubeless tire combines the extra mileage and increased puncture and blowout protection of tubeless tires with the Super Champion tread design, which was tested and proved by billions of miles of service on new cars, the company states. The tire is built with rayon cord, treated in Firestone's "Safti-Tensioned" gum dipping process. A safety liner of high-quality synthetic rubber replaces the inner tube and provides greater puncture and blowout protection. Price of the new Super Champion tubeless tire is less than a comparable size of a conventional Super champion tire and tube. The new tubeless tire is available with either black or white sidewalls.

Appointments at Petro-Tex

Four personal appointments at the Petro-Tex Chemical Corp., Houston, Texas, have been announced by plant manager J. O'C. Brown. Dilmas V. Fitz, formerly assistant general superintendent, has been named general superintendent. H. A. Harrison has been promoted to production superintendent from process superintendent. He will also perform the duties of assistant general superintendent. Replacing Mr. Harrison is C. Herbert Sloan, promoted from administrative assistant. Walter A. Myrick, III, formerly senior chemical engineer, is the new administrative assistant. All four men are longtime employees at the plant. Petro-Tex Chemical is jointly and equally owned by the Tennessee Gas Transmission Co. and the Food Machinery & Chemical Corp.

Financial News

General Tire & Rubber Co.

Nine Months to August 31: Estimated net income of $6,874,268, which is equal to $4.90 per share of common stock, compared with a net profit of $4,427,452 in the nine months ended August 31, 1954. Estimated profits in the 1955 period are 55.3% above the profits in the comparable period of the preceding year. Consolidated sales in the 1955 period totaled $209,808,056, contrasted with $154,962,719 in the nine-month period of the preceding year, an increase of 35.4%. The consolidated sales of General Tire do not include the sales of the company's radio, television and motion picture subsidiary, General Teleradio, Inc., nor those of the company's subsidiaries outside of the United States excepting its operations in Canada.

Dayton Rubber Co.

Nine Months to July 31: Net profit of $1,475,566, which is equal to $2.38 a common share, compared with $568,891, or 85c a common share, for the nine months ended July 31, 1954. Net sales in the nine months ended July 31, 1955 totaled $48,023,231, against $39,668,366 in the comparable period of the preceding year. Sales in the current nine month period represented a record for any similar period in the company's history.

I. B. Kleinert Rubber Co.

Six Months to June 30: Net income of $233,623, which is equal to $1.55 a common share, compared with $178,455, or $1.16 a common share, in the six months ended June 30, 1954. Net sales in the first six months of the current year amounted to $6,380,417, against $5,770,117 in the first six months of the preceding year.

Detroit Gasket Co.

Six Months to June 30: Net income of $1,201,761, which is equal to $2.32 a common share, compared with $449,809, or 86c a common share, in the six months ended June 30, 1954. Net sales in the first half of 1955 totaled $26,868,928, against $13,940,618 in the first half of the preceding year.

Faultless Rubber Co.

Year to June 30: Net income of $291,976, which is equal to $2.05 each on the 142,340 common shares outstanding, compared with $407,643, or $2.93 each on the 133,512 shares outstanding as of June 30, 1954.

Raybestos-Manhattan, Inc.

Six Months to June 30: Net profit of $1,988,473, which is equal to $3.16 a share, compared with $1,221,769, or $1.94 a share, in the first six months of the preceding year.

Firestone Tire & Rubber Co.

Nine months to July 31: Estimated consolidated net income of $37,584,918, which is equal to $4.62 a share, compared with $28,314,009, which is equal to $3.51 a share, adjusted to reflect the two-for-one stock split. The net income in the nine months ended July 31, 1955, was after providing a reserve of $2,605,000 for earnings of certain foreign subsidiaries which cannot now be remitted. A similar reserve of $1,451,000 was established in the nine months ended July 31, 1954. Net sales in the nine months ended July 31, 1955, amounted to $804,542,173, contrasted with $688,033,661 in the comparable nine month period of the preceding year.

American Enka Corp.

Thirty-Six Weeks to September 11: Net income of $5,188,193, which is equal to $3.83 per common share, compared with $2,901,134, or $2.59 per share for the corresponding period September 12, 1954. Net sales in the first thirty-six weeks of 1955 amounted to $48,856,919, an increase of 28% over the $38,074,500 for the first thirty-six weeks of 1954. Sales of tire yarn in the 1955 period were about 34% higher than in 1954 and sales of textile yarns were up about 7%.

Garlock Packing Co.

Six Months to June 30: Net income of $676,804, which is equal to $1.61 a share, compared with $383,187, or 91c a share, in the corresponding period of the previous year.

Hewitt-Robins, Inc.

Six Months to June 30: Net profit of $485,271, which is equal to $1.57 a share, compared with $398,912, or $1.33 a share, in the first six months of the previous year.

A. G. Spalding & Bros.

Nine Months to July 31: Net profit of $695,358, which is equal to $1.29 a share, compared with $595,358, or $1.12 a share in the nine months ended July 31, 1954.

Recent DuPont Publications

The Elastomers Division of E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del., has announced the publication of a number of technical reports. The titles of the reports follow:

"Industrial Rolls of Hypalon" (BL-287).

"Adhesion of Elastomers to Synthetic Fiber Fabrics" (BL-288).

"Aquarex L" (BL-289).

"Tetrone A-Zenite Special for Natural Rubber Latex Foam" (BL-290).

Copies of these reports may be obtained by writing the company.

V-Belt Drive Standards

The Multiple V-Belt Drive and Mechanical Power Transmission Association and the Rubber Manufacturers' Association, Inc., have announced the completion and issuance of their twenty-four page completely revised manual of recommended "Engineering Standards for Multiple V-Belt Drives." The first edition of Engineering Standards for Multiple V-Belt Drives was issued in 1951. Technological improvements in V-belts leading to greater belt strength and higher horsepower ratings, however, prompted the Technical Committees of both associations to prepare this revised edition. The associations expect that the revised standards manual will be of material assistance to the thousands of users of Multiple V-Belt Drives.

The data in the manual are based on the latest engineering opinion and research. The manual indicates the proper sheaves and belts to be used for the attainment of optimum efficiency and economy of the complete drive in relation to the particular duty required. Basic changes in the revised standard include ten pages of new horsepower rating tables for belts giving generally increased ratings for both standard quality and premium quality V-belts. For the first time horsepower ratings for premium quality belts are included. This new book shows horsepower ratings for belt speeds from 200 feet per minute to 6,000 feet per minute.

Other additions to the standard includes new horsepower rating formulas for both standard quality and premium quality belts which take into consideration ratio and belt length; and the inclusion of tolerances on all basic dimensions for V-belt sheaves covering both standard and deep groove dimensions. In addition, matching limits for sets of belts have been revised to stricter limits. Copies of the revised standard may be obtained at a cost of $1.00 each from either the Rubber Manufacturers' Association, Inc., 444 Madison Avenue, New York 22, New York, or from the Multiple V-Belt Drive & Mechanical Power Transmission Association, 27 East Monroe, Chicago 3, Illinois.

To Build Petrochemical Plant

Stauffer Chemical Co., New York, N. Y., has announced plans for the construction of a new multi-million dollar petrochemical plant at Louisville, Ky., for the production of carbon tetrachloride, chloroform, methylene chloride and anhydrous hydrogen chloride. The new plant will be located adjacent to Stauffer's existing Louisville plant. The latter currently produces carbon tetrachloride, perchlorethylene, anhydrous hydrogen chloride, and "Acritet Grain Fumigant" (a compound containing carbon tetrachloride and acrylonitrile). The new plant will be advantageously located with respect to raw materials, receiving natural gas by pipeline to the plant and chlorine by barge at Stauffer's dock facilities on the Ohio River. Structural and process engineering are now in progress. Construction will commence early next year for completion in 1957.

Albert Answers Mallinson Suit

As noted in the September issue of RUBBER AGE, Bellanca Aircraft Corp. of New Castle, Del., has been sued for $470,000 in a breach of contract action filed in Federal District Court in Washington, D. C. Sydney L. Albert, president of Bellanca Aircraft, in replying to charges made in the suit by Frank C. Mallinson, president of National Electronics Laboratories, Inc., stated that his company protected its stockholders by turning down the arrangement to acquire National Electronics. "There was no breach of contract," Mr. Albert stated, "because there was no contract. We made an offer to purchase National for 16,000 shares of Bellanca stock, subject to three conditions." He listed these conditions as: (1) An audit of National Electronics' books by a nationally-known auditing firm; (2) An appraisal of the assets, and (3) Approval of the Bellanca board of directors.

"The audit by Ernst & Ernst, the auditing firm, showed the assets were much less than originally represented to us by their statement," Mr. Albert said. The auditor's report, according to Mr. Albert, disclosed the net worth of National Electronics at $109,000, which included $70,000 due from Mr. Mallinson. This contrasted with the $357,000 shown in the company statement. The audit also disclosed that National Electronics lost $49,000 in the first five months of this year. Mr. Albert pointed out that the appraisal showed that National Electronics only had one-third of the assets it had listed.

Mr. Albert declared that "we had two options in our offer to purchase National Electronics. We could reduce the amount of Bellanca stock or terminate the offer to purchase." In view of the results of the appraisal and audit, Bellanca directors rejected the proposal and the second course was decided upon.

Obtains Elastomer License

Monsanto Chemical Co., St. Louis, Mo., has announced that it is evaluating and developing formulations for vinyl foams under an experimental license obtained from the Elastomer Chemical Corp. Vinyl foam, newest of many applications for the versatile plastic, can be formulated to provide a wide range of desirable foam properties. The product's flexibility suits it to a variety of important foam applications. Sharing in the Elastomer license are Monsanto's Organic Chemicals Division, a major producer of plasticizers for polyvinyl plastisols, and the company's Plastics Division, large-scale supplier of vinyl dispersion resins. The two Monsanto divisions are working jointly to develop formulations which will best exploit the extremely wide range of density-hardness ratios possible with vinyl foam. The company said that it is offering this technical service to vinyl foam formulators licensed under Elastomer's patented continuous process for the material.

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Acquires Hecht, Levis & Kahn

Rubber Corporation of America, Hicksville, N. Y., has announced that it has acquired from Hecht, Levis & Kahn, Ltd. of London, England, the entire share capital of their American subsidiary, Hecht, Levis & Kahn, Inc. of New York, N. Y. The purchase was made against stock of the Rubber Corporation of America; therefore, Hecht, Levis & Kahn, Ltd., will become a substantial stockholder in the Rubber Corporation of America and will be represented on its board of directors. The business of Hecht, Levis & Kahn, Inc., will continue as heretofore. Officials of the Rubber Corporation of America expect that the close relationship which will exist between the company and Hecht, Levis & Kahn, Ltd., will be of mutual benefit. Hecht, Levis & Kahn, Ltd., has subsidiaries and affiliates in the important rubber producing and consuming countries.

Introduces Super Modulene

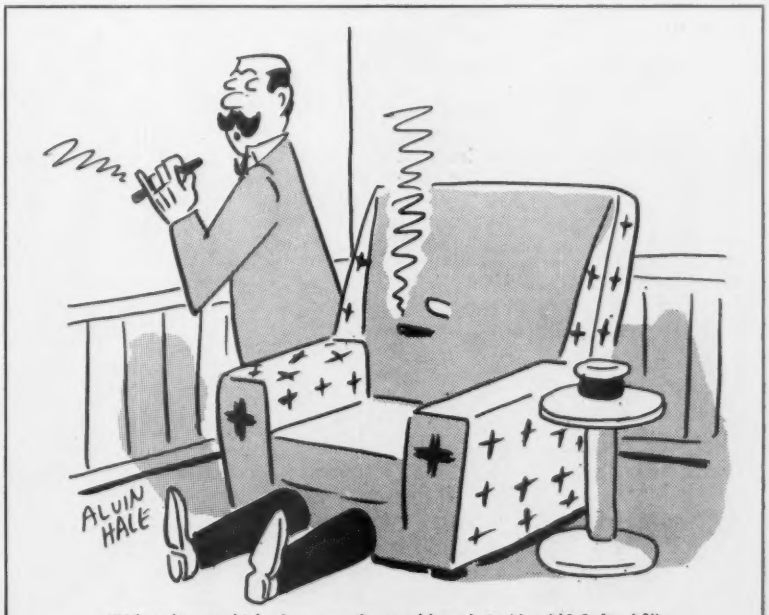
H. Muehlstein & Co. Inc., New York, N. Y. has announced a high modulus polyethylene which is called "Super Modulene." The new plastic, which is made exclusively for Muehlstein by the Koppers Co., offers higher heat tolerance, greater toughness, rigidity, chemical resistance and better appearance, Muehlstein states. Super Modulene has extreme low temperature toughness and about three times the burst strength of ordinary polyethylene. At 250°F., Super Modulene shows only a 2 to 4% dimensional change and no loss of surface finish. Super Modulene is not attacked by acids and the diffusion of liquids or vapors through Super Modulene walls is about ⅓ that of ordinary polyethylene. This broad range of properties gives Super Modulene a vast multitude of applications for improved and new thermoplastic products, Muehlstein states.

Conroy Joins Armour Research

Henry J. Conroy, well-known in the field of rubber compounding, has been appointed technical consultant in rubber research at the Armour Research Foundation of the Illinois Institute of Technology, Chicago, Ill. Mr. Conroy will give advice in connection with research performed in the rubber research laboratory of the Foundation's chemistry and chemical engineering research department. The rubber laboratory, considered one of the most complete in the country, is the only facility of its type that performs independent industrial rubber research in the middle west. Mr. Conroy, who received bachelor and master's degrees in chemistry from Harvard University, has had a broad background in the rubber industry. His earliest experience came at the Bay State Insulated Wire and Cable Co. and the Alfred Hale Rubber Co., both in Boston, Mass., and the Goodyear Tire and Rubber Co., Akron, Ohio. He later served 28 years with the General Tire and Rubber Co. at its plants in Akron; Wabash, Ind.; Mexico; Poland, and Venezuela. His duties ranged from working with synthetic rubbers to acting as a trouble-shooter in eliminating production difficulties in foreign plants.

Joins West Virginia Pulp

Lane L. Bonner, Jr., a chemistry graduate of the University of South Carolina, and recently a Navy lieutenant, junior grade, has joined the Polychemicals Division of the West Virginia Pulp and Paper Co., Charleston, S. C., as a technical sales representative. The Polychemicals Division manufactures and markets pine wood lignin and its derivatives under the trade name "Indulin," "Polyfon," "Politol" and "Polypol." These materials are used as surfactants, extenders, binders, stabilizers and sequestrants in many chemical industries.



"What do you think of our new foam rubber chair, Harold? Soft, eh?"

News in Brief

The Organic Chemicals Division of American Cyanamid Co., New York, N. Y., has announced a 4c per pound reduction in the price of thiourea, effective immediately.

A new data sheet on its special conveyor belt constructions has just been issued by the B. F. Goodrich Co. Industrial Products Division, Akron, Ohio, and is available upon request.

Construction of a large, modern building to be known as the Goodyear Distribution Center, with warehouse space of nearly 17 acres under one roof, in Brook Park Village near Cleveland, Ohio, is scheduled to begin shortly.

Normandie Co., New York, N. Y., has developed a pressure-sensitive label — the "Normandie Press-On"—for application to virtually every type of surface. A label for use on polyvinyl and polyethylene surfaces —the "Normandie Permanent Label" — is also available.

Rodney Hunt Machine Co., Orange, Mass., has released its latest industrial roll engineering Report No. 7 entitled, "Hardness or Density of Rubber Roll Coverings". Copies furnished upon request.

Phillips Chemical Co., 318 Water St., Akron 8, Ohio, has issued a preliminary list of "Philprene" polymers and masterbatches available from its Rubber Chemicals Division.

Wheelco Instruments Division of the Barber-Colman Co. is moving its Chicago office to 6610 North Sheridan Road, Chicago 26, Ill.

Water-tight, curved zippers, made with protective rubber lips that keep out air and water, are in use to seal the rear windows of this year's Ford and Mercury convertibles. The zippers were developed by the Goodrich Industrial Products Division.

Colson Corp., Elyria, Ohio, has become a wholly-owned subsidiary of Great American Industries, Inc., Meriden, Conn., through an exchange of stock of the two companies.

Dayton Rubber Co., Dayton, Ohio, has provided dealers and distributors with demonstration kits using balloons to demonstrate the safety features of tubeless tires.

Phillips Petroleum Co., Bartlesville, Okla., has issued a brochure describing its "Marlex 50" ethylene polymer.

Moving rubber sidewalks, a new means of transporting large numbers of people, are discussed in a new folder published by the Link-Belt Co., Chicago, Ill. Ask for Folder No. 2567.

"Liquid Box Toe", a quick-drying, clear plastic liquid which produces a permanent plastic box toe, is being manufactured by the Atomic Sales Corp., New York, N. Y.

T. K. Sanderson Organization, 200 East 25th St., Baltimore 18, Md., has announced publication of the first edition of the American Directory of Manufacturers Agents. The directory costs $17.50 and lists manufacturers agents in 45 states, District of Columbia, Alaska, Puerto Rico, and the Hawaiian Islands.

"The Tensile Strength of Elastomers" by G. R. Taylor and S. R. Darin, is the title of a paper which originally appeared in the "Journal of Polymer Science" and which now has been made available in reprint form by the Mellon Institute, 4400 Fifth Ave., Pittsburgh 13, Penna.

Elastomers Division, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del., has made available an interesting folder entitled, "How Does Neoprene Get That Way".

Bulletin No. 123, published by the Thiokol Chemical Corp., Trenton, N. J., contains information on the use of "VA-7", a moderately-priced aliphatic polysulfide vulcanizing agent, in Hycar 1042, GR-S type 1502, and natural rubber.

A silicone-treated felt, particularly adaptable to fashion garments such as jackets or skirts, has been put on the market by the Felters Co., Boston, Mass., one of the leading manufacturers of felt products.

Publication of a 90-page illustrated booklet describing its line of electrical wires and cables manufactured for the railroad industry has been announced by U. S. Rubber.

Phenanthrene, fluoranthene, and pyrene, three high-purity aromatic chemicals, are now available in sample quantities from the Carbide and Carbon Chemicals Co., New York, N. Y.

A new catalog on its line of shoe products for shoe manufacturers has been issued by Goodrich and is available without charge. The 25-page catalog describes, illustrates and gives specifications on more than 1,000 products.

New York Giant's pitcher, Johnny Antonelli, has entered the tire business as a franchised dealer for Firestone in his hometown, Rochester, N. Y.

Data Sheet No. 10.9-1a, issued by the Industrial Division of the Minneapolis-Honeywell Regulator Co., Philadelphia, Penna., describes thickness or weight control of rubber, pages, foil, coatings and other moving sheet materials.

Silicone seals for kitchen ranges, now extruded at General Electric's Plastics Department plant in Decatur, Ill., are said to be more effective in sealing in heat and cooking odors than any previous material used for this purpose.

The characteristic properties of Chemigum Latices 236 and 246 are outlined in a new bulletin released by Goodyear's Chemical Division. Ask for Tech Book Facts 55-189.

A 374-page bibliography on infrared radiation and its multitude of applications has been made available by the Office of Technical Services, U. S. Department of Commerce. "Infrared: A Library of Congress Bibliography", PB 111643, may be ordered from O.T.S., U.S. Department of Commerce, Washington 25, D. C., for $3.00 a copy.

A new type beach bag made of inflatable Krene that doubles as a pillow or float, has been introduced by Barth & Dreyfuss, Los Angeles, Calif.

A rubber hose that conducts water to cool the doors of open hearth furnaces has survived 637 heats, the longest service record ever set by a hose of its type, according to the B. F. Goodrich Co. Industrial Products Division.

"Plio-Tuf C-75", a thermoplastic resin produced by Goodyear Chemical, is used in the manufacture of a thermoplastic sheet from which, in turn, is fabricated a carrying case for the RelaxAcizor slenderizing machine. Eastwood Industries, Inc., Chicago, Ill., fabricates the cases from "Boltaron", sheet material produced by Bolta Products, Inc., Lowell, Mass.

How to control dust in the mixing and application operations in the manufacture of rubber goods is discussed in a new bulletin published by the Wheelabrator Corp., 1290 South Byrkit St., Mishawaka, Ind. Write for Bulletin 555-D.

Allen Plastics Corp., New York, N. Y., has announced the development of "Alfill", a liquid plastic for repairing irregularities in plastic molded cases.

A new bulletin, F 7259, published by the Wheelco Instruments Division, Barber-Colman Co., Rockford, Ill., offers some important tips to all users of pyrometers.

A waterless skin cleaner produced by the Hanlon Chemical Co., Kansas City, Kansas, is now being packaged in Bakelite polyethylene bags. Enough skin cleaner to clean a worker's hands can easily be squeezed from the bag without any waste.

Carbide and Carbon Chemicals Co., New York, N. Y., has issued a new technical folder on "Ucon" heat-transfer fluids. Ask for Form 7490.

Goodrich has published a data sheet on tank, fuel oil, and butane-propane hose. The publication describes, illustrates and gives specifications and recommended uses for the line.

Parkinson Joins United Carbon

Dr. Donald Parkinson, internationally-known rubber compounding authority, joined the United Carbon Co., Charleston, West Va., on September 1 and is initiating basic research for the company in England in uses of carbon black. According to Oscar Nelson, Jr., executive vice-president of the company, Dr. Parkinson also will represent the company in a technical capacity. Mr. Nelson added that United Carbon desires to strengthen its technical liaison in the rubber trade in Great Britain and continental Europe and that he feels Dr. Parkinson eminently qualified to assist in accomplishing this aim. Dr. Parkinson will come to this country shortly to meet with United Carbon officials and tour the laboratories and manufacturing facilities of the concern and the United Rubber & Chemical Co., its synthetic rubber producing subsidiary. He also will attend the annual meeting of the American Chemical Society in Philadelphia.

A 1953 winner of the Colwyn Gold Medal of the Institution of The Rubber Industry, Dr. Parkinson retired in August as manager of compounding research at the Dunlop Rubber Co. Research Center in Birmingham, England. Associated with Dunlop in a research capacity for 28 years, he has published many papers on the reinforcing of rubber with carbon black and allied studies. A resident of Sutton Coldfield, England, Dr. Parkinson also is widely known as a geologist. He was a lecturer in geology at Queen's University, Belfast, for two years prior to joining Dunlop. He is a Fellow of the Institution of The Rubber Industry, the Institute of Physics and of the Geological Society, and two years ago he was made honorary associate of the Birmingham College of Technology.

Akron Course Well-Attended

Approximately 200 persons have enrolled in the Rubber Compounding Lecture Series which began on October 3 at the University of Akron, Akron, Ohio. The series of lectures are being offered under joint sponsorship of the Evening Division and the Department of Chemistry of the University of Akron, and the Akron Rubber Group. The lectures are part of the Akron Rubber Group's educational program and the University's program of adult education. An unusually high response to the ten lecture series has prompted the sponsoring groups to announce that the series will be repeated in January.

Plans Ethanolamines Plant

Carbide and Carbon Chemicals Co., New York, N. Y., has announced plans for the construction of a new plant at Seadrift, Texas, for the production of ethanolamines. When this plant is completed in the autumn of 1956, it will more than double the company's ethanolamines capacity. The Seadrift site already represents a major installation for Carbide's production of ethylene oxide, ethylene glycol and butadiene. The new unit will be fully integrated with these facilities.

LABOR NOTES

U. S. Rubber Co. and the U.R.W. announced on September 28 the signing of a wage agreement granting a general wage increase of 12c an hour plus 8c additional to the skilled trades and other adjustments. The agreement affects 32,000 wage employees represented by the union in 19 company plants.

What is said to be the top pension payment in the rubber industry has been incorporated into a new agreement reached by the Mansfield Tire & Rubber Co. and Local 17 of the U.R.W. Those retiring at 65 will receive $2.25 monthly for each year of service, with no limit on the length of service. The new pension and insurance contract went into effect on October 1 and will run for five years. About 2,300 employees fall under the new contract's provisions. Other features of the new contract follow the pattern set by most Akron companies, including company-paid hospital and surgical insurance for employees and their families and a $4,500 life insurance policy for each employee.

A new wage agreement covering approximately 15,000 production and maintenance employees in nine plants of the B. F. Goodrich Co. was signed on September 4 by representatives of the company and the U.R.W. The agreement culminated wage talks which began in New York on August 23 and averted a strike that had been scheduled to begin at midnight, September 6.

The contract provides a general increase of 12 cents an hour, an additional 8c an hour for some 1,600 employes in certain skilled and maintenance classifications, and additional adjustments in the rates of certain classifications other than skilled and maintenance workers. These additional adjustments are to be determined by negotiations at the local plant level. The original agreement was amended to add a seventh paid holiday—to be selected on a local plant basis; liberalized vacations for employees having 11 through 14 years of service credit, and make-up jury pay—provision to pay an employee the difference between his average earnings and the payment he receives as a juror.

Columbia-Southern Chemical Corp., on September 12, signed a five-year contract with the union at its Barberton, Ohio, plant. The contract calls for a basic increase of 6% the first year and 3% each of the following four years. In addition, the contract calls for wage adjustments for skilled and semi-skilled employees, an improved pension plan and improved health and accident insurance as well as other benefits.

Establishes Akron Warehouse

Argus Chemical Corp., Brooklyn, N. Y., has announced the establishment of warehouse facilities in Akron, Ohio. As explained by Robert Morey, Argus' sales manager, this represents the first in what is hoped will be a series of strategically located warehouse stocks across the country, thus speeding delivery of the various Argus products.

Gussett Boiler & Welding Sold

Gussett Boiler and Welding, Inc., Canton, Ohio, fabricators of custom-built tanks, autoclaves, pressure vessels and weldments of carbon, alloy and stainless steel and non-ferrous alloys, has been purchased by J. F. Hattersley. Mr. Hattersley, former president of the Hoover Co., vacuum cleaner manufacturers, has acquired all outstanding shares of the company and announces there will be no change in the policy and operation of the business. New directors are J. F. Hattersley, R. F. Hattersley and G. E. Gussett, Jr. Officers are J. F. Hattersley, chairman of the board and assistant treasurer; R. F. Hattersley, president; G. E. Gussett, Jr., vice-president of sales, and Mildred D. Hattersley, secretary.

J. F. Hattersley was associated with the Hoover Co. from 1920 until his retirement in 1954 and remains a member of the board of directors. R. F. Hattersley, a graduate of Ohio University served as an officer on a destroyer escort in the Pacific during World War II and, after the war, was associated with the Kingston-Conley Co., Plainfield, N. J., now owned by Hoover in the production division. He was factory manager of Hoover's motor plant in Cambridge, Ohio from 1947 until 1954 and has, since that time, been plant superintendent of commercial products for Jack N. Heintz Co., at Bedford, Ohio. G. E. Gussett, Jr., has been associated with Gussett Boiler and Welding in engineering and sales capacities since termination of his army service at the end of World War II. George E. Gussett, Sr. and Carl A. Gussett, the former owners, have announced that they will devote their time to other interests.

Koger Elected Vice-President

Glenn Koger, associated with the Rome Cable Corp., Rome, N. Y., since March, 1954, has been elected a vice-president. Mr. Koger will continue as manager of the company's plant in Torrance, Calif. Before joining Rome Cable, Mr. Koger was associated with Walker Brothers, Conshohocken, Penna., for six years, as vice-president in charge of copper products. He was also a director of that company. Earlier, he was with the General Electric Co. for nineteen years. For five years of that time, he was head of the Engineering Department of the Insulated Wire Division. He is an electrical engineering graduate of Kansas State College, class of 1929.

Goodrich Research Appointments

B. F. Goodrich Co. Research Center, Brecksville, Ohio, has announced a number of appointments to its staff. The following have joined in the capacity of senior technical men: Dr. Paul J. George and Wilkinson W. Meeks. The following have joined as technical men: Emin I. Arsan and B. James Bailey. The following have joined the staff of the Research Center as research chemists: Thomas S. Solomon, Harvey Scott, Heinz Uelzmann, Elmer J. DeWitt and Hans R. Voelkl. The following have joined the staff as junior technical men: Peter R. Fatianow and Carl A. Stearns.

Los Angeles News

Los Angeles Harbor became what is said to be the largest port receiver of latex in the United States with the recent opening of the Firestone Marine Latex Terminal. The terminal was built by the Los Angeles Harbor Department in facilities leased to the American President Lines.

With the six 25,900-gallon tanks at Berth 153, which are leased to the Goodyear Tire & Rubber Co., the new installation brings the municipal port's storage facilities for latex to 455,400 gallons. This is the equivalent of over 2,354,000 dry-solid pounds of rubber.

Underground, glass-lined pipelines run from the face of the wharf to the tanks so that there is a direct ship-to-tank connection. The latex is then re-shipped by truck or rail. The new installation includes 14 tanks, and the first shipment of 300,000 gallons was piped from the tanks of the S. S. President Jefferson, in from the Far East.

Among those present at opening day ceremonies was Leonard K. Firestone, president of the Firestone Tire & Rubber Co. of California. According to Mr. Firestone, demand for liquid latex from manufacturers in the Los Angeles area made it necessary for direct shipment by ship from the Far East to Los Angeles.

H. Muehlstein & Co., Inc., has announced the removal of their offices and warehouse to 4879 East Fruitland Ave., Los Angeles 58, Calif.

C. M. Churchill has been named technical representative in the West Coast area for the Naugatuck Chemical Division of the U. S. Rubber Co. succeeding William A. Fairclough, who has been named assistant manager of rubber chemical sales with headquarters at Naugatuck, Conn.

The plant of the Latex Products Manufacturing Co. at 1810 South Main St. in Los Angeles was recently damaged by fire. Company officials estimated damages at $125,000. The company manufactures remolded foamed latex specialties.

Kenneth R. Simpson, Jr., president of Pacific Moulded Products Co., has announced that T. L. Tafe has been named executive vice-president and general manager of the company succeeding V. S. Anderson, who has withdrawn from active executive and administrative work. R. D. Henderson has been elected treasurer of the company and Charles D. Thurmond, in addition to his corporate responsibilities as secretary, has been named vice-president in charge of production and market development.

W. Taylor, formerly associated with Smith Decal, has announced the formation of the Anchor Adhesive Co. at El Monte, Calif. Production is expected to get under way in the near future.

The October 4th meeting of the Los Angeles Rubber Group, which was scheduled to be held at the Statler Hotel in Los Angeles, Calif., was to have been addressed by Dr. Harry L. Fisher, director of the Tlargi Rubber Technology Foundation. Dr. Fisher was to have spoken on the subject, "The Synthetic Rubber Age." The non-technical portion of the meeting was to have been addressed by Henry R. "Red" Saunders, head football coach of U.C.L.A. A full report on the meeting will appear in a future edition of RUBBER AGE.

Strasser Named to New Post

Appointment of Dale Strasser as materials handling engineer for the Witco Chemical Co., New York, N. Y., has been announced by Harry M. Brubaker, Witco Rubber Chemicals vice-president. In his new capacity in the Rubber Chemicals Department in Akron, Mr. Strasser is available to rubber, ink and other industries for consultation of problems relating to carbon black packaging, storage and transportation. He was formerly on the staff of the Witco-associated Continental Carbon Co. in Amarillo, Texas where he was responsible for engineering details of carbon black packaging, unit loading and shipping as well as pilot plants and production. Prior to joining Continental Carbon in 1950, Mr. Strasser was employed as pilot plant engineer of the Texas Company's laboratory at Montebello, California. He is a graduate of Iowa State College and is a registered professional engineer in California and Texas. Mr. Strasser is a member of the American Society of Mechanical Engineers, American Institute of Chemical Engineers and the American Chemical Society.

Hooker and Niagara to Merge

The boards of directors of the Hooker Electrochemical Co. and the Niagara Alkali Co., both of Niagara Falls, New York, at meetings held on October 6, approved a formal agreement for the consolidation of the two companies subject to the approval by the stockholders of each company. Both companies have directed the calling of special meetings of their respective stockholders on November 29, 1955 at which time the consolidation agreement will be submitted for approval. It is anticipated that notices of the meetings and proxy statements will be mailed to stockholders on or about October 31, 1955. Under the terms of the proposed consolidation, Hooker will be the continuing company. The consolidation will be effected by the issuance of 1.6 shares of common stock of Hooker for each of the presently outstanding 600,000 shares of common stock of Niagara.

An index to Volume 77 of RUBBER AGE will be found on Pages 163 to 166 of this issue.

Opens New Latex Facility

A new latex compounding plant that will speed service to the South's growing textile industry, and other southern users of latex compounds, has just been put into operation at Gastonia, N.C., by the Naugatuck Chemical Division, U. S. Rubber Co. The plant will be capable of mixing any of the hundreds of natural and synthetic rubber latex formulations used in nearby plants of the textile, carpet and paper industries. Claude H. Allard, who has been a technical representative for Naugatuck Chemical in the South for the past five years, has been named branch manager at the new plant. He will manager the plant and also be sales manager of the Gastonia district.

The new plant is a streamlined operation, using high-speed mixing equipment. The latex flows through pipe lines from storage tanks to the compounding equipment, then directly into railroad tank cars or tank trucks. Or the compound is piped into drums that are shipped by trailer truck. The plant was constructed on eight acres of land owned by U. S. Rubber, which also has a textile plant in Gastonia. It has 30,000 square feet of manufacturing and storage space.

Mr. Allard, the newly appointed branch manager, joined Naugatuck Chemical in 1947 and spent three years at its plant in Naugatuck, Conn., in development and technical service before his assignment as technical representative in the South. A native of Lowell, Mass., he was educated in local schools and has a bachelor's degree in textile chemistry from Lowell Technological Institute.

Southern Ohio Holds Fall Meeting

Approximately 100 members and guests of the Southern Ohio Rubber Group attended the September 22 meeting held at the Engineers Club in Dayton, Ohio. Principal speaker for the meeting was 1st Lieutenant Malcolm J. Rogers of the United States Air Force, who spoke on "The Use of Polymers in Present Day Military Aircraft." In his paper, Lt. Rogers discussed plastics, adhesives and rubber-like materials. He also displayed cuts of various parts of military aircraft showing applications of these materials. During a question and answer period, the speaker showed pictures and samples of aircraft materials which had been exposed to atomic radiation, and the effects of this radiation on the materials. He also showed a sound motion picture which detailed most of the new types of experimental aircraft.

Ace Rubber Products Expanding

Ace Rubber Products, Inc., Akron, Ohio, has announced plans to move part of its operations to Cuyahoga Falls, Ohio, in a general expansion of its facilities. According to current plans, the company will move its final inspection, packing and shipping facilities to the new site which provides about 30,000 square feet of floor space. All of the firm's manufacturing facilities will remain in Akron. It is expected that 40 persons will be employed at the Cuyahoga Falls installation.

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You'll find this new, easy-to-process Thermoplastic truly remarkable. *Super Modulene* can be cooked at 250°F with only 2 to 4% dimensional change and with no loss of surface finish. In exhaustive tests it withstood blows of 32 foot pounds per inch at a temperature of –78°F. In pipe form it holds pressures of 1,000psi.

Washing machine agitators, steering wheels and air conditioner parts are just a few of the hundreds of applications of revolutionary new *Super Modulene.*

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Canadian News

J. Ross Belton, president of Gutta Percha and Rubber, Ltd., Toronto, has announced the following executive appointments: A. P. Dawson, vice-president in charge of marketing; C. L. Brittain, vice-president in charge of development and C. S. Pope, general sales manager.

Mr. Dawson joined Gutta Percha in 1936 after graduating in engineering from the University of Toronto, and advanced through the Sales Department to become general sales manager in 1953. As vice-president in charge of marketing, he will be responsible for selection, promotion, distribution and sale of the company's products, both domestic and export.

Mr. Brittain also graduated in engineering from the University of Toronto. He joined the company in 1924 and became factory manager in 1950. He will now be in charge of product and process development.

Mr. Pope joined Gutta Percha in 1919 and now assumes the position of general sales manager, in charge of domestic sales. He was formerly export manager and general merchandising manager, and has visited most of the 42 countries with which Gutta Percha does business.

The new appointments result from Gutta Percha's continuing expansion and reorganization program, designed to extend the scope of the company's production and services, Mr. Belton said in making the announcement.

Dr. F. K. Schoenfeld, vice-president in charge of research for the B. F. Goodrich Co., Akron, Ohio, in a recent address before a management meeting of B. F. Goodrich Canada, Ltd., stated that the growing world demand for rubber can only be supplied by increasing the production of synthetic rubbers. Dr. Schoenfeld said that without the present facilities for producing man-made rubbers in Canada and the United States, the world would this year be short at least 1,000,000 long tons of rubber.

"Recognizing that it requires about seven years for new rubber trees to produce, it is apparent that any plantings made now will contribute little to world needs for rubber by 1960 when we estimate world rubber consumption will exceed 3,000,000 long tons," Dr. Schoenfeld declared.

He said the increasing demands for rubber must be made up, as they are now, by expanding facilities for producing the man-made materials. Crude rubber is now about double the price of Canadian and American made rubbers although crude rubber can be produced at a considerably lower cost than any presently known man-made rubbers.

"Synthetic plants are being expanded and an increasing tonnage of man-made rubber is being exported," he said. "Meanwhile, research is being accelerated to develop chemical rubber that will replace crude rubber for all purposes.

"Evidence of this may be found in the recent announcement that a research team of Goodrich-Gulf Chemicals, Inc., had duplicated the tree rubber molecule, goal of scientists for generations. (Goodrich-Gulf Chemicals, Inc., is jointly owned by the B. F. Goodrich Company and Gulf Oil Corporation).

"Recently the B. F. Goodrich Co. announced that large truck tires made of the new chemical 'tree rubber' were giving mileage and highway service comparable with tires made wholly of tree rubber. Until then crude rubber had been considered essential for truck tires, the one principal tire type in which synthetic rubbers had not been equal, or superior to tree rubber."

Ira G. Needles, president of B. F. Goodrich Canada, Ltd., recently announced that the company's three-year internal expansion program will be completed within the next year. The program will cost approximately $3,500,000 and will result in a 30% increase in plant capacity. The expansion program is primarily devoted to new equipment and machinery in the Tire Division and the Industrial Products Division.

Planning for the program began in 1952, but most of the new equipment has been installed within the past few months. Additional equipment is on order and will be installed by next summer. No production loss has been occasioned by the work in the plant and operations since last summer have been on a twenty-four hour, six-day week basis, Mr. Needles stated.

Three major Canadian rubber companies have filed application for leave to appeal to the Supreme Court of Canada for a reversal of an opinion by the Exchequer Court which recently ruled that retail outlets, such as the T. Eaton Co., Ltd., do not have to pay sales and excise taxes on special brand tires. The three manufacturers, Goodyear, Goodrich and Firestone, originally sought to have the government declare that Eaton and similar companies were manufacturers for the purposes of taxation. This would have increased the tax payable on special brand tires which compete for the market against those produced by the rubber companies.

P. H. J. Delacour, executive vice-president of Cabot Carbon of Canada, Ltd., Sarnia, Ont., has announced an important expansion of the company's plant facilities to increase production of oil furnace carbon blacks from 20,000,000 pounds to 55,000,000 pounds per year. "Expansion," states Mr. Delacour, "should be completed during the next two months, permitting almost three times the original plant production of a variety of oil furnace blacks to meet Canada's increasing industrial requirements." "This increase," says Mr. Delacour, "should be sufficient for the present and future anticipated oil furnace black requirements of the entire Canadian rubber manufacturing industry."

Cabot Carbon of Canada, Ltd. began operations in 1953. As Canada's first carbon black plant, the project was heartily endorsed by various interested government departments. Its defense contribution was considered significant, and it was rightfully regarded as an important addition to Canada's industrial growth and maturity.

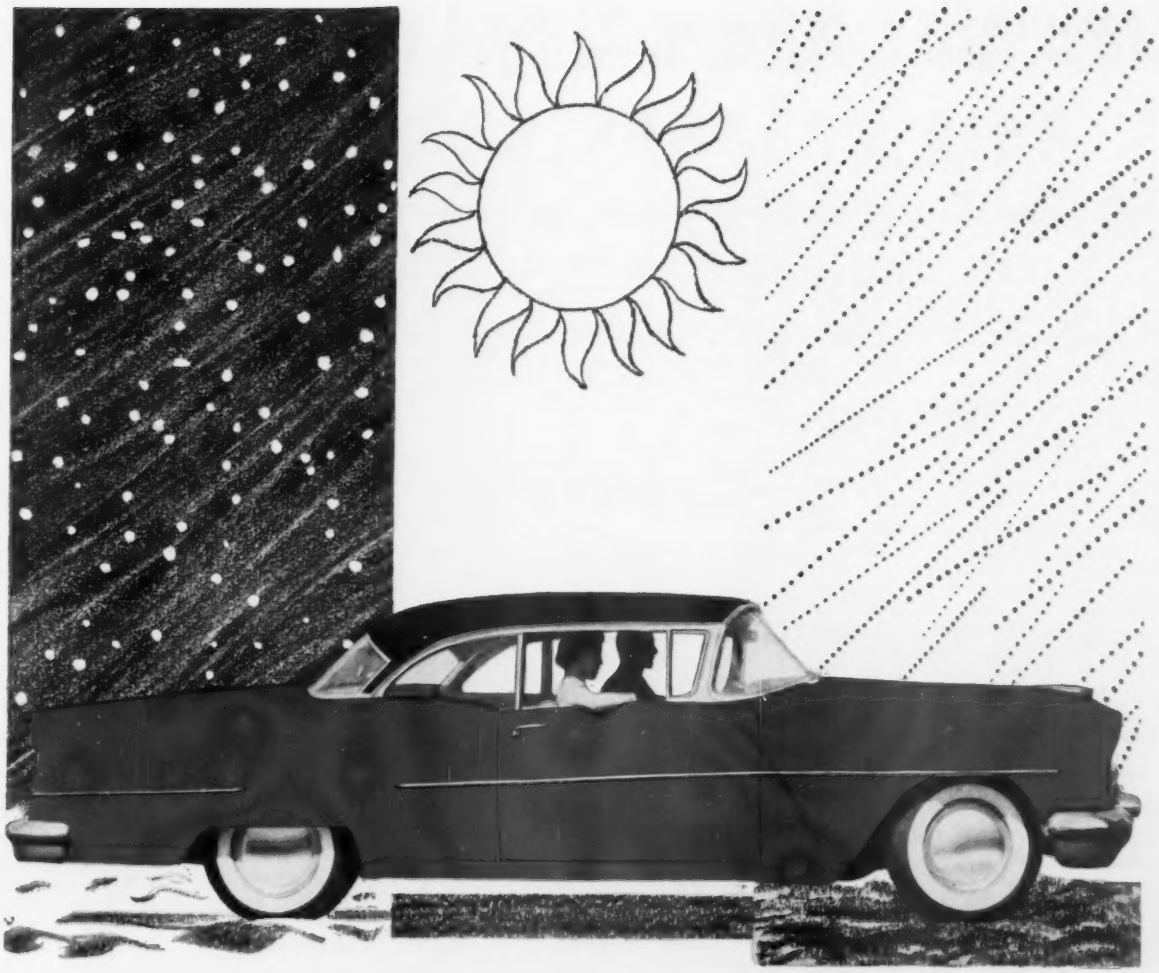
The Cabot plant has been producing primarily HAF, high abrasion furnace blacks, including the ISAF, intermediate super abrasion furnace type. It is also producing FEF, fast extruding furnace blacks, and will continue to make increasing quantities of this type available. Provision has been made for the manufacture of other blacks as needed by the Canadian rubber industry. The highly aromatic liquid hydrocarbons used for production of oil furnace carbon blacks are being supplied in large proportion by Canadian refineries.

Operations at its new $9,000,000 anhydrous ammonia plant now being built on part of its large industrial-site area near Kingston, Ont., is expected to begin by the middle of 1956, according to H. Greville Smith, president, Canadian Industries (1954) Ltd. Mr. Smith spoke at a recent special meeting of stockholders which ratified the directors' plan to apply for supplementary letters patent to revert to the name Canadian Industries Ltd. The right to use this name and the trademark CIL was allotted to the present company in the division last year of the original CIL between CIL 1954 and DuPont Securities of Canada Ltd. The adoption of the original name is expected to be made by the end of 1955.

On another part of the property near Kingston is CIL's $22,000,000 synthetic fiber plant which was officially opened early this month. Mr. Smith indicated that remaining parts of the tract, embracing about 1,500 acres, are being held in reserve as sites for other projects for the future. He also disclosed that sales in the first nine months of 1955 of CIL 1954 have risen over the comparable period a year ago, attributable to improved economic conditions and higher industrial activity.

Dominion Rubber Co., Ltd., recently opened its new plant which is located on a nine-acre tract in Toronto. The new structure provides more than 70,000 square feet of floor space and the large size of the tract provides ample room for future expansion. The new plant and property are estimated to have cost about $860,000. Equipping and stocking the new plant brings the total investment in the property to about $1,500,000. The new structure will house the sales and warehousing headquarters of the company's Ontario Division, and will employ approximately 200 persons.

The new $22,000,000 "Terylene" plant of Canadian Industries (1954) Ltd. at Millhaven, Ont., was officially opened on September 28. The Millhaven project was started in 1953 and pilot plant production began late in 1954. The main units of the plant went into operation during the summer. When fully operating, the plant will employ about 800 persons.



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Obituaries

Irving T. Bennett

Irving Theodore Bennett, chairman of the board and chief executive officer of the General Cable Corp., New York, N. Y., died on October 4 at his home in Irvington-on-Hudson, N. Y. He was 55 years old. Mr. Bennett had been associated with General Cable since 1953. Born in Bridgeport, Conn., Mr. Bennett was graduated from the Sheffield Scientific School of Yale University in 1921. He received a master's degree in metallurgy from Yale in 1923. From 1923 to 1926 he was employed as a metallurgist by the Metropolitan Engineering Co., Brooklyn, N. Y. In the three succeeding years, he was general manager of the Murray Radiator Corp. In 1929, Mr. Bennett became sales promotion manager of the Revere Copper and Brass Co., Inc. From 1944 to 1953 he was a vice-president of Revere, with headquarters in Baltimore. In 1951, he was elected a director of the company. He also held the title of general merchandising manager.

Mr. Bennett became a director of General Cable on May 1, 1953 and was elected chairman of the Executive Committee. In April, 1954, he was elected chairman of the board and chief executive officer. During World War II, he was a member of the Aluminum Advisory Committee of the U. S. Munitions Board. Sigma Xi, the national engineering society, conferred honorary membership on him in 1953. Mr. Bennett also held directorships in the Metal Textile Corp., Roselle, N. J.; the Metal Textile Corp. of Canada, Ltd., Toronto, Ont., and Telecables and Wires, Ltd. of Winnipeg, Man., of which he was also a vice-chairman. He was also a member of the advisory committee of the Grand Central Branch of the Chase-Manhattan Bank in New York. Mr. Bennett is survived by his wife, two sons, and a daughter.

Charles P. Gulick

Charles P. Gulick, honorary chairman of the board of the Nopco Chemical Co., Harrison, N. J., died on September 4 at Dover General Hospital, Dover, N. J. He was 70 years old. Mr. Gulick retired a year and one-half ago as board chairman of the company which he helped to found in 1907 as the National Oil Products Co. He served as its president from 1932 to 1949. The company name was changed to Nopco Chemical in December, 1946. Mr. Gulick served during World War II as New Jersey State Chairman of the Committee for Economic Development. He was a founder and past-president of the Sulphonated Oil Manufacturers Association of America. He leaves his wife and three sons.

Can't locate the office copy of RUBBER AGE when you need it? Use the coupon on page 161.

Fred E. Palmer

Fred E. Palmer, plant manager of the continuous process rayon plant operated by the Industrial Rayon Corp. at Painesville, Ohio, died at his home in Painesville on October 2. He was 55 years old. Mr. Palmer, a native of Cleveland, joined the Industrial Fibre Co. of America, a predecessor of Industrial Rayon, in 1921. He was appointed assistant plant superintendent at Cleveland early in 1937, and a year later went to the post he held at the time of his death. The plant he managed is considered by many as the world's most modern rayon plant. The plant's present operations include the production of high tenacity tire rayon and the fabrication of tire cord and tire fabric. Mr. Palmer is survived by his wife and daughter.

Walter R. Smith

Walter Richard Smith, formerly an executive of the Michelin Tire Co. in the United States, died on October 2 in St. Peter's General Hospital, New Brunswick, N. J. He was 64 years old. Mr. Smith entered the employ of Michelin Tire in 1909 as an office boy. When the company closed down its American operations in 1929, he took charge of selling the plant and some 300 homes of employees, as secretary of the Michelin Realty Corp. In recent years, Mr. Smith had been treasurer of the Michelin Corp. and the United States Technical Research Corp., in New York, N. Y. Mr. Smith leaves his wife and son.

Frederick E. Loud

Frederick E. Loud, president of the Kessler Chemical Co., Inc. and chairman of the board of the Merchants Products Corp., both of Philadelphia, Penna., died on September 11 in Cooper Hospital, Camden, N. J. He was 65 years old. Well-known as a processor of fish and vegetable oils for industrial uses, Mr. Loud was a founder and former president of the Murray Oil Products Co. of Philadelphia, and of the Industrial Oil Products Co. of Los Angeles, Calif. He was a member of the Union League Club of Philadelphia. Mr. Loud is survived by his wife and two daughters.

Paul T. Dennison

Paul T. Dennison, president and one of the founders of the Minnesota Rubber and Gasket Co., Minneapolis, Minn., died on September 9 after a brief illness. He was 43 years old. Mr. Dennison was born in Minneapolis and attended the University of Minnesota. After serving with the United States Army during World War II, he returned to Minneapolis and organized, together with George E. Carlson, the Minnesota Rubber and Gasket Co., to produce custom molded rubber products and hydraulic rubber seals for industrial use.

Sets Up New Colors Unit

Kentucky Color & Chemical Co., Louisville, Ky., has announced the addition to its regular dry color operation of a department for the production of water dispersions of organic and inorganic pigments and selected oxide pigments. Kentucky Color expects to be in full production by September 1. Samples for laboratory evaluation will be available in August. Heading technical sales and research in this new department will be John G. Smith, and in charge of plant production will be Paul Tudder. Mr. Smith was formerly with United Wallpaper as development chemist in pigment dispersions. Mr. Tudder was engaged in the production of color dispersions for two years with United Wallpaper before joining Kentucky Color. His previous experience was with General Dyestuff Corp. in their New York laboratory. John Smith has a B.S. from Northwestern University at Evanston, Ill., and Paul Tudder has his B.S. from Muhlenberg College, Allentown, Penna.

International Parting Agent

International Products Corp., Trenton, N. J., has announced the development of a pure carnauba wax emulsion which finds use as a mold lubricant, parting agent, release agent, etc. It can be used on natural rubber, synthetic elastomers, polyesters, polyurethanes, epoxy resins, phenolics, etc. The new product exhibits the following properties: Solid content—12%; carnauba wax content — 80% of solids; emulsifier content—20% of solids; emulsifier type—soap; ash—6% of solids; pH of emulsion —8.5; stability to heat—excellent (at least 150 hours at 70°C.); stability to freezing —excellent (stable to 2 freeze thaw cycles); shelf stability—excellent (1 year minimum).

William S. Kimley

William S. Kimley, retired analytical chemist for the Spray-Dip Rubber Corp., Buffalo, N. Y., died on September 8 in St. Francis Hospital, Buffalo. He was 78 years old. His retirement from Spray-Dip in 1952 terminated seventeen years' service with that company. Before that time, he had been chief chemist for the former Hewitt-Gutta Percha Rubber Corp. Born in Waverly, N. Y., in 1900, Mr. Kimley served on the staff of Starkey Seminary before coming to Buffalo. Mr. Kimley was a member of the American Society of Chemical Engineers. He is survived by his wife and three sons.

John Myles

John Myles, vice-president of the Dominion Rubber Co., Ltd., Montreal, Quebec, Canada, until his retirement in 1940, died recently following a lengthy illness. He was 69 years old. Mr. Myles joined the Canadian Consolidated Rubber Co. in 1913. He was named secretary-treasurer of Dominion Rubber in 1917 and general manager in 1919. Mr. Myles was elected a vice-president of Dominion Rubber in 1924. He is survived by his wife and son.

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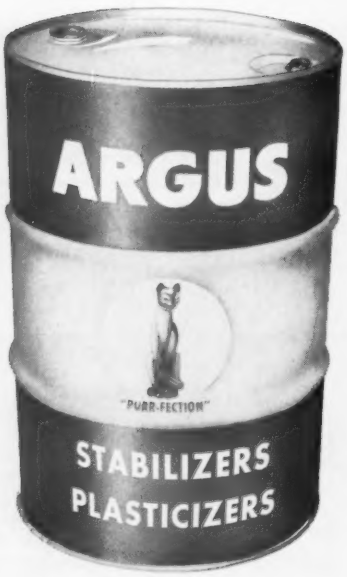

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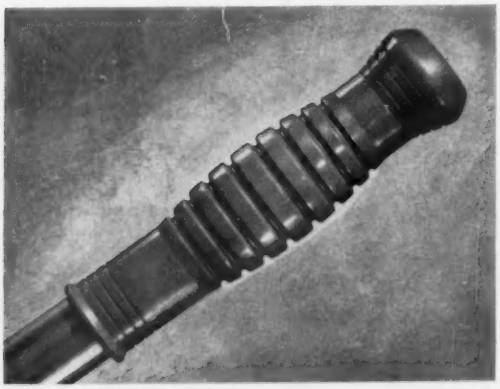
New Goods

Vinyl Plastic Hand Grip

Another all-vinyl plastic hand grip has been developed by the Hungerford Plastics Corp. of Rockaway, N. J. The sturdy vinyl plastic grip, designated as "Model E", is of an entirely new and original design. The center section of this grip is made to conform to the palm of the hand and concentric circles running crosswise give excellent gripping qualities. The inside coring gives a shock absorber action while at the same time assuring



a snug fit to the bar. The slightest exertion of pressure tends to increase the gripping action. The vinyl material from which the grip is compounded and injection molded is corrosion-resistant, will not leave stains or discolorations on the hands or clothing, and is not affected by weather, salt water, oils or gasoline.

The Model E grip is made for ⅞ inch, ¾ inch, and ⅝ inch bars, and is available in standard colors of red, green, yellow, maroon, black, blue, white and ivory. Special colors can be furnished if required. This new grip and the regular line of Hungerford all-vinyl grips are recommended for bicycles, hand tools, golf carts, lawn mowers, wheel chairs and for numerous other applications. They are sold exclusively by the Ohio Rubber Co., Willoughby, Ohio.

Jet Plane Air Hoses

Dayton Rubber Co., 2342 West Riverview Ave., Dayton 1, Ohio, has developed air hoses for jet airman that are lighter and more flexible than those previously in use. The new "life lines" are made of natural rubber and range from ⅜ to ⅝ of an inch in diameter. Designed to make flying at 50,000 to 60,000 foot altitudes safer for jet pilots, the hoses are leakproof and each contains a wire spiral to prevent collapsing or kinking. When not in use, the hoses hang down alongside the flying suits like a string and do not get in the way of the pilot. The air hoses have four important functions: to feed oxygen masks at altitudes over 10,000 feet; to fill pressure suits with compressed air to keep blood from "boiling" should the cabin become depressurized; to keep air circulating inside the complex flying suits, and to keep fighter pilots from blacking out during fast turns.

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Color 1" Lovibond Yellow	15 max.	50 max.
Unsaponifiable	1.5% max.	
Saponification Value	198 — 203	198 min.
Acid Value	197 — 202	190 min.
% F.F.A. as Oleic Acid	99 min.	
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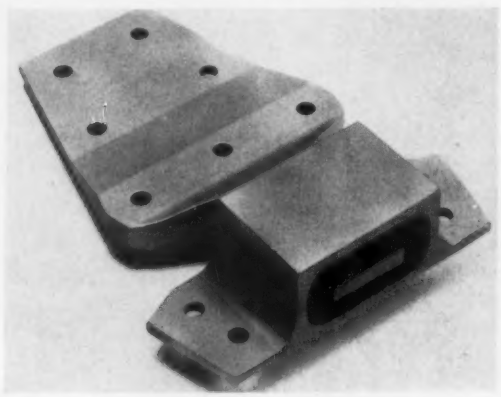
Stillman Rubber Flexmount

Unusual lightweight aluminum and rubber sandwich support brackets and shock mountings have been developed jointly by the Stillman Rubber Co., Culver City, Calif., and the Lockheed Aircraft Corp., Burbank, Calif. First application of the unit, called "Flexmount", is to support after-body engine sections of the Lockheed Model 1049 "Super Constellation". Operating under conditions of high frequency vibrations caused by



the engine reduction gear train, the Flexmount is an interesting example of the use of rubber to absorb repeated shock. The Flexmount is designed to withstand applied loads in shear and additional resultant loads caused by engine vibrations. These loads are taken out by 11¼-inch diameter bolts, with the vibration completely absorbed by a neoprene rubber core 1 1/16-inch high by 1⅛-inch wide by 1¼-inch deep bonded to the aluminum. Previous all-metal designs, in many different variations, failed due to vibration. Unlike conventional mounting-shock brackets, the Flexmount has unlimited service life because the rubber can be replaced when worn, company officials point out.

Morecon Suction Hose

A new water suction hose that springs back to original shape if run over by trucks or other heavy equipment has been introduced by the B. F. Goodrich Co. Industrial Products Division, Akron, Ohio. Called "Morecon", a secret of the springiness of the new hose is a continuous coil of hemp rope, specially treated and imbedded in thick rubber. Medium-weight fabric plies are wrapped around the hose to support end-pull or tugging action in suction service. The hose is recommended to handle normal suction with maximum working pressures ranging from 70 pounds in the one-inch size to 40 pounds in the three-inch size. A corrugated cover of tough black rubber resists sun-checking, abrasion and the effects of aging. The Morecon hose tube is a smooth, non-porous rubber that handles gritty and mildly corrosive fluids. The new hose is available in sizes, 1, 1¼, 1½, 2, 2½ and 3 inches.

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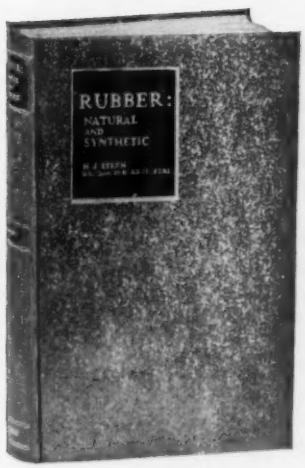

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About the Author—

Dr. Stern has been engaged as a chemist in the rubber industry for more than 25 years and since 1935 has practiced successfully in London as a Consultant. He is the author of "Practical Latex Work" and of many publications concerned with the scientific and technological aspects of natural and synthetic rubber.

SUMMARY OF CONTENTS BY CHAPTERS

Part I

1. **Historical Introduction; Mastication; Vulcanization.**
2. **Plantation Rubber.**
3. **Natural Rubber: Composition, Reactions, Derivatives.**
4. **Properties of Vulcanized Rubber.**
5. **Compounding Ingredients.**
6. **Rubber Machinery; Solvents and Solutions; Reclaiming.**
7. **Latex.**

Part II

8. **Synthetic Rubber (History and Development).**
9. **Manufacture and Technology of Synthetic Rubbers.**
10. **Synthetic Rubber Latices.**
11. **Synthetic Resins; Plastics.**
12. **Manufacturing Processes (of various rubber products).**
13. **Testing and Analysis.**

Sources of Further Information; Metric Equivalents; Subject Index.

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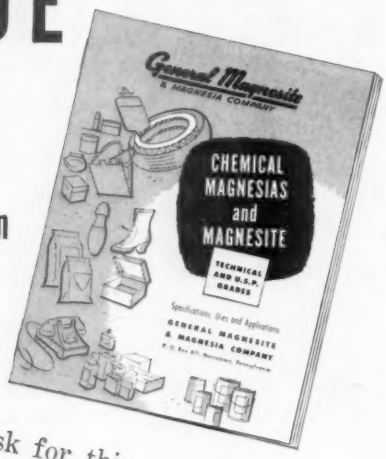

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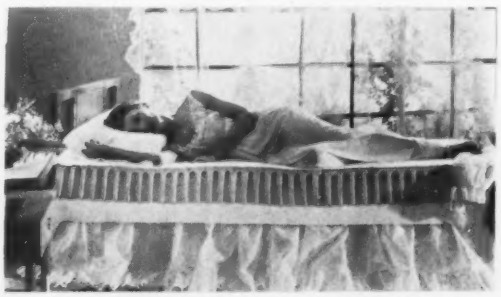
Warm-N-Hot Water Bottle

A newly-designed rubber bottle, announced by the Sundries Division of the B. F. Goodrich Co., Akron, Ohio, averages 10°F. cooler on one side than on the other when filled with hot water. The cooler side offers immediate relief from the too-hot side, and saves dumping and refilling with cooler water. Called the "Warm-N-Hot" bottle, hundreds of tiny, raised, rubber ribs form the surface of the cool, "air conditioned" side of the bottle. Conventional bottles have plain, flat surfaces. The ribs permit cooling air to circulate when the bottle is placed rib-side down on the body. As water temperature drops, the bottle may be reversed so that the hotter, unribbed flat surface on the opposite side may be applied. The dual heat surfaces are said to permit longer, effective use of the bottle from one filling of hot water.

Six-Inch Foamex Mattress

Firestone Industrial Products Co., Akron, Ohio, a division of the Firestone Tire & Rubber Co., has introduced a new "Foamex" mattress which is a full six inches deep rather than the conventional four and one-half inches deep. The new mattress is designed so that the firmness of the mattress is varied to fit the different



sections of the body. In the head and foot sections, where body weight is light, the air spaces are larger and therefore the Foamex is less firm. In the center section the air spaces are smaller in order to provide greater firmness for support of the heavier mid-sections of the body. The uncovered mattress core shown herewith demonstrates the depth of the new Foamex mattress, plus its form-fitting features.

Pale Green Latex Gloves

The Sundries Division of the B. F. Goodrich Co., Akron, Ohio, has introduced a new line of surgeons' gloves which are colored pale green. The new "hospital green" latex gloves are said to reflect less glare from the bright lights needed in operating rooms. The low reflectance value of their soft green color reduces strain on the eyes of surgeons, the company states. Said to be the first gloves ever made for surgeons' use in any but the traditional white or brown colors, the new gloves are pure rubber latex, tissue thin, with tapered fingers that produce a snug fit for nearly "gloveless" touch. They withstand repeated sterilizing. Backs of the gloves conform to the natural shape of the hand, allowing flexing without restriction in order to cut down hand fatigue.

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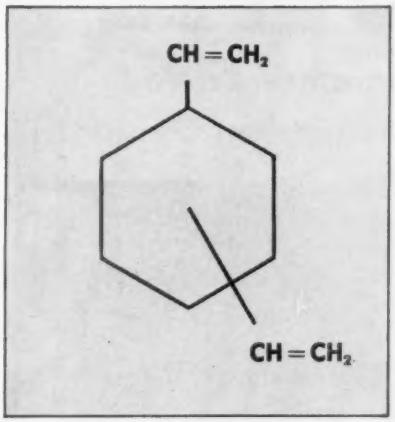

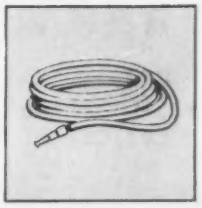

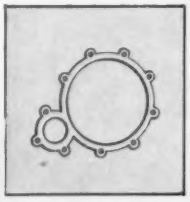

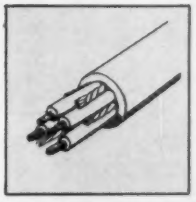

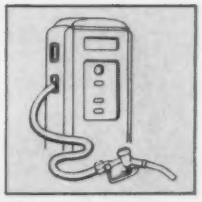

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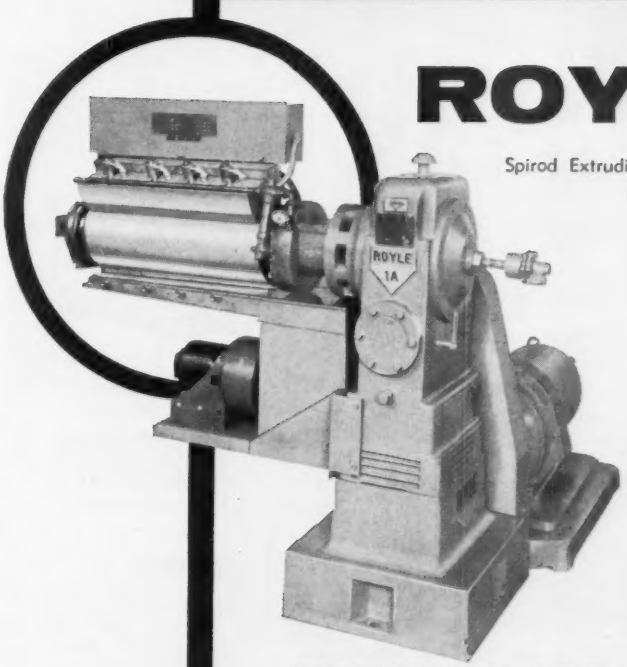

Strainers, Cooling Troughs, Light Wire and Cable Capstans, Motorized Take-ups, Temperature Control Units.

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ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

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The Performance-Proved Brand of Magnesium Oxide

Mooney machine demonstrating scorch protection quality of MAGLITE D.
Ideal for Compounding Neoprene, Hypalon , Butyl, Nitrile, Natural, and GR-S Rubbers

Uniformity of chemical and physical characteristics, high scorch protection, and ease of dispersion are desirable characteristics you can always count on when you specify the MAGLITE brand. These products are available as MAGLITE M, an extra-light magnesium oxide, and MAGLITE D, a dense compound for minimum storage space.

Merck's basic *magnesium carbonate* is another fine product you can depend on. As a filler and reinforcing agent, it provides unexcelled uniformity and quality.

To assist you in overcoming compounding problems, the Marine Magnesium Division maintains a pioneering rubber laboratory devoted to research and technical service on magnesium products.

Stocks are quickly available from 15 warehouses strategically located throughout the country.

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Marine Magnesium Division

RAHWAY, NEW JERSEY SOUTH SAN FRANCISCO, CALIFORNIA

Dayton Self-Inking Roller

A new self-inking roller for metal address plates has been developed by the Dayton Rubber Co., Dayton, Ohio, to give sharper impressions and longer life. By means of a special vacuum process, air is forced out of the synthetic rubber roller and ink is run deep into the pores. Fresh ink keeps working to the surface as the roller is used—virtually an automatic ink well, the company points out. Despite their advantages, the new rollers are said to cost less than those previously used which employed a powdered graphite for inking. Department stores and auto service stations are primary users of the new type at the present time, but the rollers are being tested for eventual use on other business and office machines. As service station plates often are kept outside, a special ink was developed to flow freely in temperatures from 0 to 100°. The ink uses dyes instead of the usual pigments.

Rubbermaid Wastebasket

Wooster Rubber Co., Wooster, Ohio, has added another product to its line of household goods, a polyethylene wastebasket. The "Rubbermaid Wastebasket" features construction qualities that completely eliminate denting or chipping. The 12-inch high waste-

basket is so designed that it takes a minimum of space. In addition, it can be wiped off with a damp cloth. The unit is being manufactured in three colors—pink, white and yellow, to harmonize with most decorating schemes. Other than its use in kitchen, bedroom and nursery, the wastebasket also finds use in the home workshop.

U. S. Rug Underlay Airbase

U. S. Rubber Co., New York, N. Y., has introduced a new sponge rubber underlay for use under carpets. The product, called "U. S. Rug Underlay Airbase", is made of resilient sponge rubber, reinforced with a strong fiber backing. It is 53 inches wide and is sold in 30 yard or 20 linear yard rolls. It has great tensile strength, the company states, is easy to lay and clean. Carpet beetles, moths and vermin will not live in the new sponge underlay, the company states.

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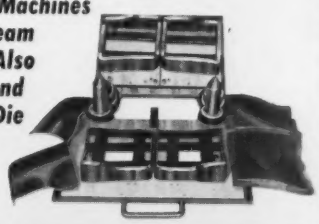

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Meets Bell's rigid requirements for
UNIFORMITY • SERVICE
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Distributed by WHITTAKER CLARK & DANIELS, INC.
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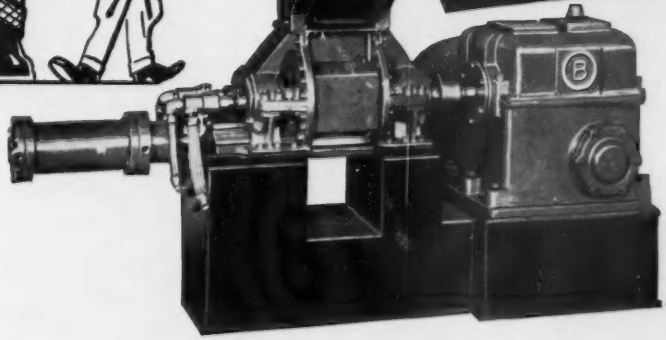
Here's another LITTLE FELLOW,
but capable of doing Very Important Work-

the *new* STEWART BOLLING
Laboratory Spiral-Flow Intensive Mixer



You can entrust to this equipment the most significant tests which lead to intelligent, profitable manufacturing. Capacity — 6 pounds of 1.5 gravity stock. All of Bolling's well-known, successful features: patented Spiral-Flow sides, split end frames, anti-friction bearings, a.c. or d.c. Rounds out a line of outstanding intensive mixers handling up to 475 pounds.

Ask on your letterhead for BULLETIN "A-10"

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• INTENSIVE MIXERS AND MILLS •
CALENDERS • REFINERS • CRACKERS
HYDRAULIC PRESSES • PUMP UNITS
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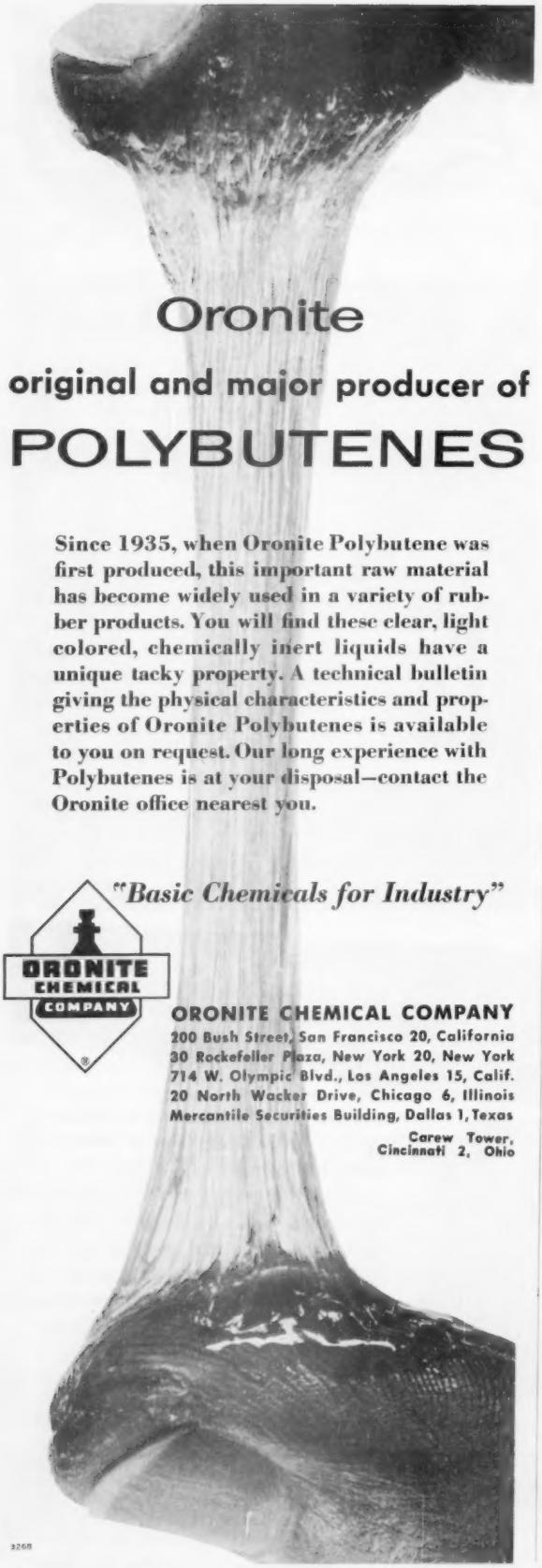
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POLYBUTENES
Since 1935, when Oronite Polybutene was first produced, this important raw material has become widely used in a variety of rubber products. You will find these clear, light colored, chemically inert liquids have a unique tacky property. A technical bulletin giving the physical characteristics and properties of Oronite Polybutenes is available to you on request. Our long experience with Polybutenes is at your disposal—contact the Oronite office nearest you.
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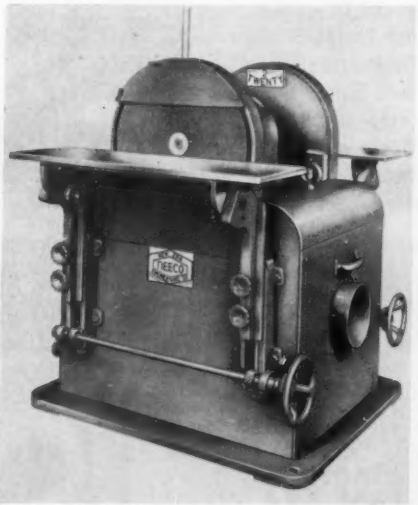
Mercantile Securities Building, Dallas 1, Texas
Carew Tower, Cincinnati 2, Ohio

New Equipment

Neeco-2-Twenty Disc Grinder

Through the development of a special method of processing abrasive-coated cloth discs, New Era Engineering Co., 458 West 29th Street, Chicago 16, Ill., has produced a grinder for hard rubber, plastics, leather, etc., which operates at a perimeter speed of more than 18,000 feet per minute. Known as the Neeco-2-Twenty Abrasive-Coated Cloth Disc Grinder, the new unit is a 20-inch diameter double disc machine. It is powered with a special 10 h.p. motor, fully adequate to handle heaviest material removal loads without reducing disc speed. It is direct driven, and supplied in 220 or 440 volts, 60 cycle. The flexibility of the unit should be of particular interest to users of abrasive machines. When both rapid material removal and fine finish are required, for example, the use of coarse grit abrasive on one disc and fine grit abrasive on the other disc will accomplish this efficiently and economically. The Neeco-2-Twenty is also designed to house its own high-efficiency dust collector within the machine itself (as optional equipment). This feature will be especially important when the machine is placed where dust collecting equipment is either not available or too distant for practical connections.



Electronic Indicating Scanner

An electronic "watchdog" which makes it possible to test and control continuously an unlimited number of industrial processes from a single vantage point has been developed by the Fielden Instrument Division of the Robertshaw-Fulton Controls Co., 2920 North Fourth St., Philadelphia 33, Penna. The new instrument, called an indicating scanner, monitors a variety of process variables involving level, temperature, thickness, mechanical movements, tolerances, weight and pressure. It will keep a steady check on 6, 12, 24, 48 and more steps in a manufacturing process, according to the company.

Thomaston TEXTILES

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specifically engineered to meet your needs

TIRE FABRICS • HOSE AND BELT DUCKS
CHAFERS • YARNS • THREADS • CORDAGE
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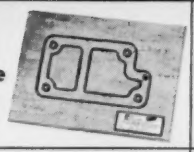
RUBBER FABRICATORS NEED ACCURATE CUTTING DIES

For Cutting
Rubber, Neoprene, Plastics, etc.
Sheeting, Foam, Sponge, Cellular,
Cured & Uncured
Gang Dies Our Specialty

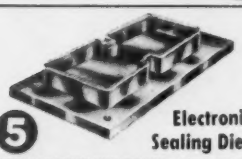
3 Mallet Handle Dies

4 Steel Rule Cutting Dies

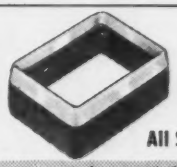


2 Steel Rule Clicker Dies

5 Electronic Sealing Dies



1 All Steel Dies



We can also die cut your materials on jobs you don't wish to handle yourself.

Dies for cutting gaskets, flashing from molded parts, rubber soles, foam and sponge for furniture padding, inflated toys, clothing and footwear, etc.

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STEEL RULE DIE MANUFACTURERS
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Intelligent Service to Industry for Almost a Quarter Century

ALCOGUM AN-10

(SODIUM POLYACRYLATE)

Serves the latex compounding industry both as stabilizer and thickener.

ALCOGUM AN-10 is a 10% solution, having a pH of 10. Provides more effective viscosity control of compounds even during prolonged storage, and greater dilutability through adequate stabilization.

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Types, grades and blends
for every purpose, wherever
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of Rubber Goods—
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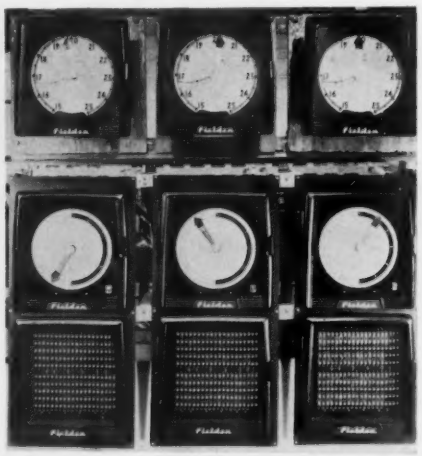
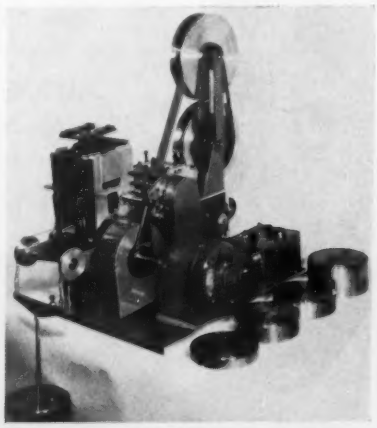
The speed of scanning depends largely upon the number of points to be checked, with a maximum rate of one point per second. Where there is a process that strays beyond the pre-set control zone the scanning stops at that point and actuates an alarm or flashes a signal. The indicator dial shows the extent of the deviation.



Associated control systems may automatically correct the condition. In the accompanying photograph, three identical 76-point scanning instruments are undergoing final tests. The units at the top indicate the temperature of each step in the process as it comes under control. The units in the middle tell which step is being controlled.

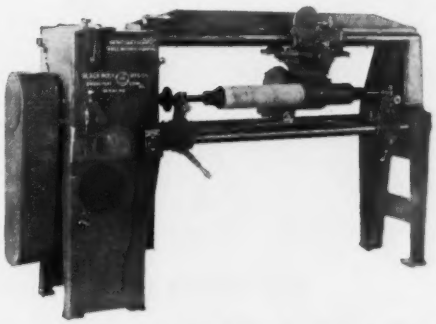
Custom Scientific Abrader

Designed to determine the resistance to abrasion of flat surfaces of material, measured in terms of volume loss, the CSI-A Abrader, produced by Custom Scientific Instruments, Inc., Arlington, N. J., essentially consists of two independent units: (1) A vertical track which



carries the specially prepared specimens around to meet the abrasive, and (2) a carriage which rests on roller bearings and has provision for keeping a strip of abradant in continuous motion while abrading the samples. The directions of motion of the abradant and samples

A Dual Purpose Machine For Grinding and Polishing



RUBBER ROLLER AND TUBE GRINDING & POLISHING MACHINE (4-LM)

Wide and flexible range of speeds and feeds insure profitable production grinding and polishing of tubes and medium size rollers.

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BLACK ROCK MFG. CO.
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Lacquers for Rubber...

Manufacturers of quality lacquer products for industry, equipped to fill your lacquer needs quickly and economically.

CLEAR AND COLORED

- NEW, improved LACQUERS for Rubber Footwear, or any rubber product where lacquer is used as a pre-cure coating.
- SOLE and HEEL LACQUERS. Eliminate seconds by using our special pigmented lacquers. Can be supplied in any color desired.
- NCP 1909. An anti-tack coating. Spray or brush it on any tacky surface where powder is normally used to kill tack before cure.
- CASUALS, footwear. NCP 1909 is an excellent dulling and anti-tack agent on edges of soles or crepe wrappers used in the manufacturing of casual type footwear.
- SPECIAL lacquers for all types of rubber products.

Write for complete details

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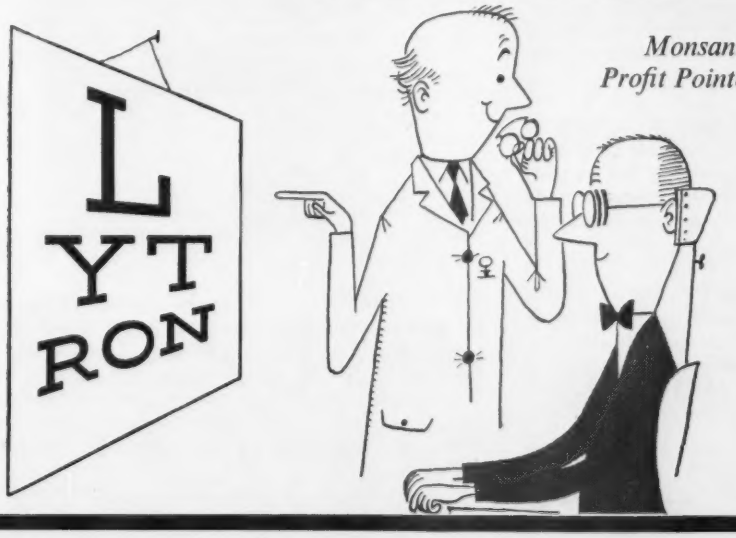


Monsanto Profit Pointer

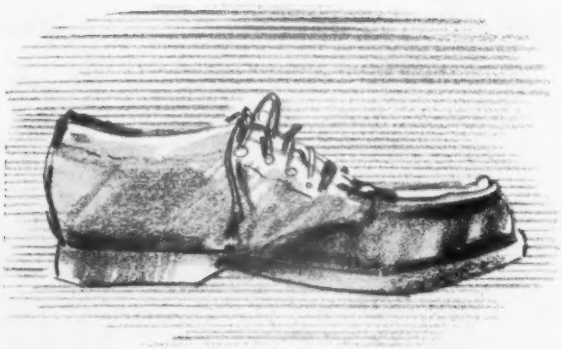
Look at Lytron*

*LYTRON: REG. U.S. PAT. OFF.

Monsanto supplies a Lytron thickener for every latex or aqueous system!

No other manufacturer offers such a broad and versatile line of thickening agents. Monsanto's Lytrons are 100% synthetic polyelectrolytes. All contribute extremely high viscosity. Lower your costs by obtaining maximum thickening efficiency with minimum amount of Lytron. Supplied in both solid and liquid form. For technical bulletins and free experimental samples, write on your letterhead to Monsanto Chemical Company, Plastics Division, Dept. RA-10, Springfield 2, Massachusetts.

MONSANTO



Diary of an old shoe

"Walked, walked, walked—
on pavement and dirt— month after month
—mile after mile, rain or shine..."

But this shoe could take it! It is one of millions of shoes that have the modern type of rubber sole reinforced by the incorporation of high styrene resins and plasticized with low cost **PANAREZ** hydrocarbon resins.

PANAREZ resins are tack producing agents and rubber softeners which make definite improvements in "flex crack", abrasion and tear resistance, tensile strength, and aging properties. At the same time, **PANAREZ** resins permit the use of larger than normal quantities of filler without sacrificing quality. This has resulted in important reductions in raw material costs.

PANAREZ resins, derived from petroleum, act excellently as polymeric plasticizers. They provide excellent color and color stability. They have low specific gravity. They are particularly useful in GRS rubbers where improvements in processability and stock physicals are desired—at a simultaneously reduced cost.

Whether you compound or use rubber for shoe soles, wire covering, floor tiles, tires, hose, insulators or some other products, we welcome the opportunity to work confidentially with you on your particular problem. Readily available in various color grades and unlimited quantities, **PANAREZ** resins offer the compounder a completely reliable, low cost raw material.

For full information
write or wire Dept. RA

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PAN AMERICAN CHEMICALS CORP

555 FIFTH AVENUE, NEW YORK 17, N.Y.

HYDROCARBON PANAREZ RESINS

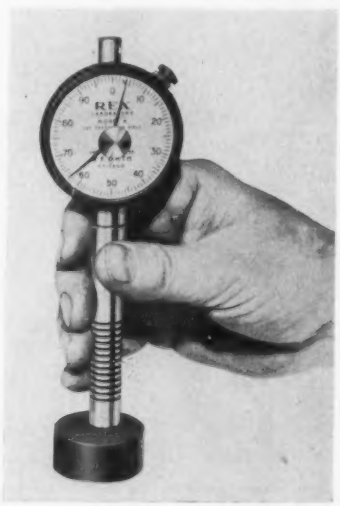
PANAPOL Hydrocarbon drying oils

PANASOL Aromatic solvents

are opposite, and contact between the two is maintained by dead weights attached to the carriage by a cable-spring-pulley arrangement. The instrument is said to have the following advantages: moving abrasive; heat dissipation; alternate and intermittent periods of abrasion; range of application, and directional abrasion. The capacity of the abrader is 6 to 8 specimens, depending upon the number of calibration zinc specimens. The size of the sample tested is ⅞ by 2¼ inches. The abradant width is one inch in 50 yard rolls.

Orth Hardness Gauge

A new rubber hardness gauge introduced by W. F. Orth, 800 South Ada Street, Chicago 7, Ill., features a second hand that moves with the dial hand and remains at maximum reading until turned counter-clockwise to reset. The unit is said to be ideal for production control and laboratory work in that it measures rubber hardness



instantly, and also gives creep reading. It is said that the unit is accurate to plus or minus one-half durometer point consistently and indefinitely. The new tester complies with ASTM specifications for rubber hardness. No calibrations or adjustments are necessary on the tester, which is fully jeweled and of rugged construction. The Orth tester comes in an individual mahogany case.

Fin-Vayor Elevator Storage Rack

George Finney & Sons, American Fork, Utah, is marketing a new combination elevator-storage rack for tires. Called the Fin-Vayor, 320 tires can be stored in a 32-foot unit although it occupies a floor space of only 73 square feet. With a 20-foot unit, a maximum of 200 tires can be stored. In addition, one man can unload and transfer for storage or shipment what it normally takes three men to do. The Fin-Vayor does not require permanent installation and may be moved from one location to another.

Humidity Conditioning

(Continued from Page 88)

dilution, low pressure steam is put through the coils in the regenerator chamber. This action heats the solution sprayed there, forcing it to give up the absorbed moisture. This moisture is entrained by a contacting air stream and purged to the outside. The reconcentrated solution returns to the sump.

The dehumidified air in the system at Borger, after it leaves the Kathabar unit, is mixed with 1500 cfm of air recirculated from the space. This mixture is cooled as necessary and delivered to the space at 55°F., 41 grains of moisture per pound. The two heating coils are used for winter operation.

Summary

There are several features of this simple system which make it ideal for applications requiring both humidity and temperature control. The leaving air moisture content, 31 grains per pound, is a dewpoint of 36°F. The Kathabar unit accomplishes this directly, using only 70° water. There is no sub-cooling and reheating. The water itself can be reused in other processes or can be recirculated cooling tower water. The conservation of water is becoming a matter of increasing importance throughout the country, and especially in the Texas Panhandle area.

Maintenance on the system is very small. The Kathabar unit has only two moving parts—the solution pump and the regenerator fan motor. Solution concentration is automatically maintained and there is no loss or carryover of the solution.

The balance of the system uses heating and cooling for that part of the air conditioning job for which they are best suited, i.e., temperature control.

A new **packaged data reduction system** for converting pneumatic or electric signals into tabulated digital records has been introduced by the Fischer & Porter Co., Hatboro, Penn. Called the "Automatic Logger," it may be integrated with industrial instrumentation systems currently in use for automatic control, computing, cost accounting, statistical analyses, or process reset with a punch card programmer.

Perfection of a **new type chart paper,** with special properties which improve the legibility of instrument records, has been announced by the Foxboro Co., Foxboro, Mass. Special sizing agents have been added to permit sharp, distinct recording, without feathering. It is sold under the name of "Humitex."

Installation and removal of tubeless tire valves is said to be simplified with the use of the **506 Valve Inserter** introduced by the Bridgeport Brass Co., Bridgeport, Conn. The unit consists of a 12-inch case-hardened steel handle with a swivel head internally threaded to fit all standard cap threads.

A **portable temperature tester** with fast readings from —50°F. through +1000°F. is now being marketed by the Simpson Electric Co., 5200 W. Kinzie St., Chicago 44, Ill. The unit is 7-15/16 inches wide, 6 inches high and 2-15/16 inches thick.

PROCESSORS

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NYLON-RAYON

and

OTHER FABRICS

All Widths and Weights

with

RESORCINOL FORMALDEHYDE LATEX Compounds

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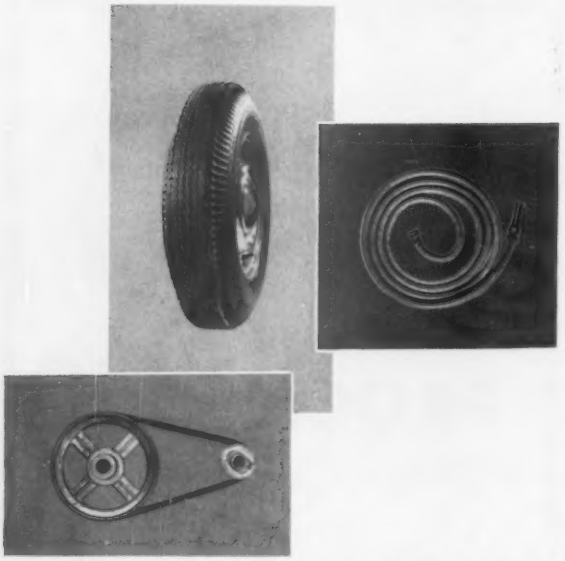
"A QUARTER OF A CENTURY EXPERIENCE"



IMPROVE ADHESION AND STABILITY OF YOUR DIP SOLUTIONS WITH SYNVAR RESINS

NEW LINE OF SYNVAR BONDING RESINS SOLVES LATEX DIP PROBLEMS IN TIE AND RUBBER COATING INDUSTRIES.

■ SYNVAR can solve many of those adhesion problems constantly arising in the manufacture of rubber-fabric products. Take latex dip solutions, for example. Straight resorcinol-formaldehyde (R-F) solutions, added to the dip to improve adhesion, are usable for only 24 hours. Short life of such bonding agents results in a waste of money and time. Synvar bonding resins give latex solutions longer working life; eliminate gelling of dips.

■ SYNVAREN PLS-R is a *stopped* R-F resin that in itself is stable for a year, and for two months or more in a prepared latex dip. It fully replaces R-F solutions, giving adhesions equal to freshly prepared R-F in latex dips. SYNVAREN PLS-R is compatible with a variety of latices, is non-corrosive, and eliminates the need for handling irritating chemicals.

■ SYNVAREN 631 and SYNVARITE BRLD, the phenol-formaldehyde bonding resins for latex dips, have excellent stability. These resins give somewhat lower specific adhesion than SYNVAREN PLS-R, and are considerably lower in cost. Either resin can be used alone or in combination with SYNVAREN PLS-R to obtain balanced physical properties.

■ SYNVAR bonding resins improve the quality of your tires, belt drives, or coated fabrics. For further information write for Synvar specification bulletin No. 300.

SYNVAR RESINS

SYNVAR CORPORATION
WILMINGTON 99, DELAWARE

Experienced service to customers is our greatest achievement . . . customer progress and satisfaction our greatest reward.

Reviews

BOOKS

Handbook of Engineering Materials. Edited by D. F. Miner and J. B. Seastone. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 5½ x 8½ in. 1382 pp. $17.50.

There are several good engineering handbooks available to industry. However, because engineers in one field are increasingly working with materials from another field, the conventional handbooks frequently leave something to be desired. The handbook under review has been designed to help the engineer make a proper selections of materials. For example, it furnishes the electrical engineer with information about plastics, while at the same time gives the plastics engineer data on electrical properties.

The volume is divided into four main sections, as follows: (1) General Information on Materials; (2) Metals; (3) Non-Metals; (4) Construction Materials. It provides general information on specifications and standards, statistics on the application of materials, and mathematics and physical tables. Metals covered include the ferrous metals, aluminum, magnesium, copper and its alloys, zinc, nickel, and other pure metals. Non-metals discussed include wood, paper, fibers, plastics, rubbers, carbon products, industrial chemicals and lubricants. Construction materials are also covered.

The co-editors of this new handbook are well qualified. Mr. Seastone is manager of research, development and engineering for the Metals Division of the Olin Mathieson Chemical Corp. Mr. Miner is director of the division of student personnel and welfare at the Carnegie Institute of Technology. In all, a group of over fifty specialists, each an expert in a particular field of materials technology, contributed to this mammoth work.

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Problems and Control of Air-Pollution. Edited by F. S. Mallette. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 6 x 9 in. 272 pp. $7.50.

The proceedings of the First International Congress on Air-Pollution, held in March, 1955, under the sponsorship of the American Society of Mechanical Engineers, are presented in this book. The author, Mr. Mallette, is executive secretary of the A.S.M.E. Committee on Air-Pollution Control, and was largely responsible for the Congress and the quality of the papers presented. Air-pollution experts from six foreign countries participated. The book includes 25 separate papers divided into four basic groups, namely, gaps in the available knowledge on air-pollution, current developments, the treatment and recovery of sulfur dioxide, and experience in air-pollution abroad. Also included is the Calvin W. Rice Lecture by Sir Hugh E. C. Beaver which is a masterly summary of the British smog problem and the remedies proposed. Because of the direct interest of tire and other rubber manufacturers in smog problems in particular and air-pollution in general, this book should prove of value to rubber technologists.

•

Electronic Data Processing in Industry. Published by the American Management Association, 330 West 42nd St., New York 36, N. Y. 6 x 9 in. 258 pp. $7.75.

Called a "case book of management experience," the material for this book has been prepared in the main from the papers and supplementary material prepared for the Special Electronics Conference held earlier this year in New York City sponsored by the Finance Division of the American Management Association. Some twenty papers are included, divided into two major categories, namely, the planning stage and electronic equipment and its use. Specific applications covered include computers, industrial television, electronic controls, navigation and communications, and amplified light. Of particular interest are two papers, one tracing the evolution of electronic data processing and the other discussing future developments. Typical of AMA books, the present work is crammed full of facts and figures.

Silicic Science. By Ernst A. Hauser. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y. 6 x 9 in. 188 pp. $5.00.

This book had to be written. It represents the first time that all of the current information on colloidal properties of siliceous matter has been put betwen two covers. Basically, the book is based largely on notes used in a course on "The Colloid Science of Silicon" given at the Massachusetts Institute of Technology. It approaches the chemistry of silicon from a new angle based primarily on the colloid chemical properties of silicon compounds.

Among the key topics covered in this work are ultramicroscopy and electron microscopy, differential thermal analysis, infrared spectroscopy, surface tension, viscosity, silicone resins, the formation of elastic silicones, and thixotropic properties of bentonite and Hectorite. Dr. Hauser makes no effort to cover all the fields of silica, e.g., cement, glass and silica refractories, but rather has selected at random those fields which are most neglected in textbooks, such as pharmaceutical applications and drilling fluids. These are fields which may act as stimulants to further progress in the development of commercial applications of siliceous matter.

The book contains 14 chapters in all, and includes both author and subject indexes. Brief references are made to the silicone rubbers and to thixotropic rubber compounds. The customary footnotes or literature references are not included with the text, but a bibliography listing the most pertinent literature used is appended to each chapter.

•

Symposium on Aging of Rubber. Swedish Rubber Institute, P. O. Box 7310, Stockholm 7, Sweden. 8½ x 12 in. Price: Sw. cr. 27 (approximately $5.25). (Mimeographed).

This is a compilation of the seven comprehensive papers delivered at the Symposium on Aging of Rubber which featured the Spring, 1955, meeting of the Swedish Rubber Institute (Sveriges Gummitekniska Förening) in Karlstad. The papers were presented in English, German, Danish and Swedish, and are reproduced in those languages in the bound volume.

Of the seven papers, four were delivered in English. These were: "The Significance of Accelerated Aging Tests," by G. W. van Raamsdonk, Rubber-Stichting, Delft, Holland; "Improved Methods of Laboratory Aging," by L. Bottomley, Monsanto Chemicals, Ltd., London, England; "The Effect of Antioxidants on Autoxidation in Light," by M. Davies and C. E. Kendall, Dunlop Research Center, Birmingham, England, and "Non-Staining Antioxidants" by G. E. Williams, Imperial Chemical Industries, Ltd., Manchester, England.

The three other papers at the symposium had the following titles: "The Mechanism of Deterioration of Rubber," by Dr. Holger Leth-Pedersen, A/S Nordiske Kabel; "An Antioxidant for Heat Resistance," by Dr. F. von Spulak, Farbenfabriken Bayer, A.-G., and "Various Factors in the Aging of Rubber," by Eugene Ganslandt, Trelleborgs Gummifabriks, A-G.

All of the charts, graphs and photographs utilized by the authors in their presentations are reproduced in the volume.

•

Molybdenum Catalysts for Industrial Processes. Climax Molybdenum Co., 500 Fifth Ave., New York 36, N. Y. 5½ x 7½ in. 24 pp.

The use of molybdenum in catalysts, according to this new booklet, has increased 600% over the past two years. The reasons for this rapid growth can be seen in the various types of commercial reactions which are reviewed in the booklet. In addition to a discussion of each type of reaction, the publication lists a summary of typical reactions and conditions, showing reaction type, starting material, catalyst, temperature, pressure and other conditions that might apply in any particular process.

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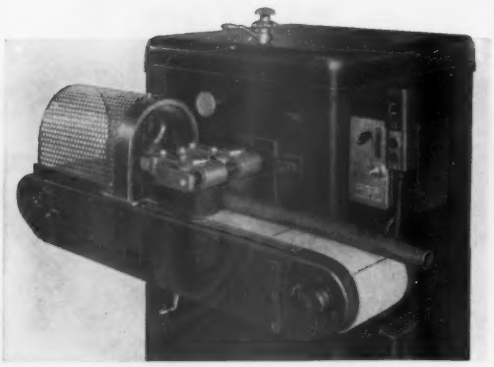

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BOOKLETS, CATALOGS, etc.

Kel-Ray Projectors. Nuclear Products Division, M. W. Kellogg Co., 225 Broadway, New York 7, N. Y. 8½ x 11 in. 24 pp.

A portable gamma ray projector which is said to have decided advantages over conventional X-ray equipment used in industrial radiography is the subject of this booklet. The publication offers a simple explanation of the three gamma ray sources used with this new radiographic device—Cobalt 60, Cesium 37, and Iridium 192—and details operation and construction features of the models presently available. Of particular interest is a gamma ray intensity and film exposure guide which permits a radiographer to locate and schedule work so as to minimize the disruption of other work and predict any unsafe working areas. Copies of this booklet may be obtained from the Metal & Thermit Corp., 100 East 42nd St., New York 17, N. Y., exclusive sales agent for the Kel-Ray projectors.

•

Celogen-AZ. By R. R. Barnhart. (Compounding Research Report No. 38). Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn. 8½ x 11 in. 12 pp.

This illustrated report describes the use of "Celogen-AZ", a nitrogen blowing agent for sponge rubber and expanded plastics. The properties of the material are outlined and special sections of the publication deal with its use in cellular soling, in expanded polyvinyl chloride, in neoprene, in Paracril and in polyethylene. An interesting series of photographs depicts the use of Celogen-AZ in expanded polyvinyl chloride (plastisol method) from the preparation of the plastisol to the production of the final molded article. Other photographs show various products, all of which have utilized this blowing agent in their manufacture.

•

"Thiokol" Vulcanizing Agent VA-7. (Bulletin No. 123). Thiokol Chemical Corp., 780 North Clinton Ave., Trenton 7, N. J. 8½ x 11 in. 8 pp.

This new bulletin offers the latest compounding information on the use of VA-7, a liquid aliphatic vulcanizing agent for unsaturated elastomers. The material finds use in curing acrylonitrile rubbers, GR-S type rubbers and natural rubbers. The bulletin points out that laboratory tests have indicated that the use of VA-7 in elastomers produces outstanding heat-aging resistance, non-blooming in the cured state, and easy and uniform dispersion. Particular attention is paid to the use of the product in Hycar 1042, GR-S 1502 and natural rubber.

•

Plioflex Rubber—Pliolite Latex. Chemical Division, Goodyear Tire & Rubber Co., Akron 16, Ohio. 8½ x 11 in. 24 pp.

"Plioflex" rubbers and "Pliolite" latices were introduced to the rubber industry last April as trade names for the GR-S-type rubbers and latices produced by Goodyear's Chemical Division. This booklet offers a brief history of the government rubber program and of the development of these Goodyear products. The properties of the dry rubbers and the latices are outlined. Interesting and colorful flow charts depict manufacturing procedures. Other sections of the booklet describe the various types and how they may best be applied.

•

Indonex Plasticizers in Molded Bumper Compounds. (Circular 13-52). Indoil Chemical Co., 910 S. Michigan Ave., Chicago 80, Ill. 8½ x 11 in. 8 pp.

A study of molded bumper compounds is shown in this circular. The formulations and physical properties are presented in easy to read tables. In addition, the present study shows Lupke impact resilience, compression set, premanent set and low temperature brittleness data. All compounds, the circular further states, have been tested for adhesion to metal. The compounds include GR-S 1502, Amber Crepe and blends of GR-S 1502 with GR-S 1708.

Natural Rubber: Some Activities in the Field of Development. French Rubber Institute, 42 Rue Scheffer, Paris 16e, France. 8½ x 11 in. 30 pp.

From 1948 onwards, the International Rubber Development Committee has made available annually to the International Rubber Study Group a broadly based survey of the major items of development work on the utilization of natural rubber. The work described has been carried on by producer-financed organizations whose programs of work are coordinated by the committee. These surveys cover each calendar year. This latest report, published both in French and in English, covers the year 1954, and describes activities in such fields as rubber road surfacing, transportation, agriculture, etc. In addition, the report discusses new applications for rubber and latex and progress being made in technically classified rubber. Also described are the publicity and educational activities carried on by the group. A list of current publications issued in 1954 is appended to the booklet.

•

Steel Shelving. (Catalog FF 188) Remington Rand Division, Sperry Rand Corp., 315 Fourth Ave., New York 10, N. Y. 8½ x 11 in. 48 pp.

This new illustrated catalog is designed to assist users in the selection of proper shelving for both standard and special requirements. It is divided into three sections for ready reference and covers steel storage shelving, shop equipment, and steel storage cabinets. Listed are complete descriptions and detailed specifications for both open and closed bin type shelving racks, shelves, shelving backs, shelving sections, shelf brackets, shelving parts, shelving doors, box inserts, shelf boxes, shelving ladders, etc. In addition, steel counters in a wide range of sizes are described. Also described and illustrated are such shop items as machine stands, foremen's desks, bar racks, nail bins, drill rod and milling cutter inserts, tool panels, tool inserts and small parts inserts.

•

Automatic Process and Transfer Equipment. W. F. & John Barnes Co., Rockford, Ill. 8½ x 11 in. 16 pp.

This informative, two-color booklet uses photographs, line drawings, diagrams and brief text to describe twenty materials handling and special processing units designed and built for the railroad, ordnance, automotive, farm implement, electrical appliance, food and other industries. Featured in a two-page, fold-out section is a diagram of a cylinder production line—a typical example of production line engineering. It shows how sixteen Barnes work-handling and processing units are incorporated into the development of a specific production line, and illustrates the scope of the company's expanded service in the field of special process and transfer equipment.

•

Polypol S-70 in Semi-Hard Rubber Compounds. (Technical Bulletin No. 203). Polychemicals Division, West Virginia Pulp and Paper Co., Charleston A, South Carolina. 8½ x 11 in.

The comparative properties of semi-hard rubber compounds made with Polypol S-70 versus GR-S 1500 types are outlined in this technical report. It should be noted that Polypol S-70 is the company's new name for the coprecipitate of lignin and a butadiene-styrene copolymer formerly produced under the name of Indulin 70-GR-S.

•

Controlled Air Power. (Bulletin ML-3). Bellows Co., 222 W. Market St., Akron, Ohio. 8½ x 11 in. 8 pp.

Full color illustrations, describing the complete line of "Controlled Air-Power" devices as well as typical application photos, are shown in this bulletin. In addition, it contains illustrations and descriptions of drill press feeds, vises, hydro-checks, rotary feed, index tables, self-contained drilling units, and valves and cylinders.

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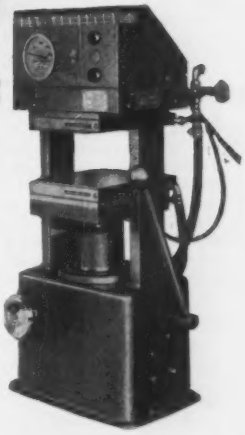

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MARKETS

NEWS-PRICES

NEW YORK, OCTOBER 7, 1955

Natural Rubber

Since our last report (September 6), the price of spot rubber on the New York Commodity Exchange has moved in the rather wide range of 575 points, high for the period being 50c reached on September 14, and low being 44.25c reached on October 5 and again on October 6. The average price of spot rubber for the month of September was 48.27c based on 21 trading days. This compares with an average of 45.85c in the previous month.

The trade reports that the world rubber trade has become extremely upset by the gyrations in natural rubber prices. The sharply lower trend is clearly indicated in the various reports filtering in from all leading centers. One of the most disturbing factors is the lack of any apparent change in conditions which would normally affect prices. What is more, trade sources state, the price structure is fading away without accompanying pressure of actual rubber from producing areas.

Influence of Futures Market

According to reports, Indonesia is offering most sparingly. Singapore does not appear to be a seller while Siam seems to be out of the market. The break in the price structure seems to be led entirely by the futures market.

Whether or not speculative selling will be sufficiently aggressive from this point on to further depress prices is "anybody's guess," one trade source states. It is quite evident, however, that buyers are not at all anxious even at the lower price levels.

Those bearishly inclined are stressing the continued apathy on the part of consumers and are pointing to U. S. Commerce Department statistics for August which show record synthetic rubber production in the United States. Natural rubber consumption in August was only 39.8% of new rubber consumed, a decline of 2.4% from July and the lowest ratio in months.

The world-wide nature of the current situation is heightened by advices from abroad. Singapore reports speculative liquidation as well as up-country selling. London advices indicate that the Polish demand has been satisfied for the time being, at least. Russia is showing no particular interest, although there has been moderate demand from Germany and Austria.

Reports from Indonesia state that shippers are slow to make new commitments owing to political uncertainty. The general disposition is to await more definite word on the outcome of the elections.

Planting Behind Schedule

Announcements from Kuala Lumpur state that rubber replanting on small holdings in the Federation of Malaya is seriously behind schedule. Only 50,000 acres have been replanted so far, compared with the target of 90,000 acres set by the government for the end of the year. At this rate, government officials said, the over-all target of 500,000 acres would not be reached on schedule. Higher grants recently made available by the government for smallholders to increase replanting may stimulate activity in this field.

Price Data

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM SEPTEMBER 7 TO OCTOBER 7

Sept.	Spot	Dec.	Mar.	May	July	Sales
7	47.00	46.70	45.35	44.00	42.55	276
8	48.25	47.70	46.35	44.95	43.55	239
9	48.88	48.45	47.00	45.60	44.20	354
10	....	....	....	....	....	....
11	....	....	....	....	....	....
12	48.50	48.00	46.65	45.35	43.85	174
13	49.25	48.74	47.25	46.10	44.80	402
14	50.00	49.45	47.80	46.60	45.35	418
15	49.75	49.10	47.40	46.35	45.00	121
16	48.25	48.00	45.80	44.80	43.80	575
17	....	....	....	....	....	....
18	....	....	....	....	....	....
19	48.88	48.20	46.30	45.20	44.20	334
20	49.50	49.25	47.00	45.90	44.80	201
21	49.00	48.75	46.60	45.10	44.00	240
22	49.25	48.85	46.75	45.40	44.00	289
23	48.50	48.35	46.10	44.95	43.75	193
24	....	....	....	....	....	....
25	....	....	....	....	....	....
26	47.25	46.55	44.35	43.20	43.20	306
27	46.62	45.95	43.95	42.80	41.50	375
28	47.62	46.90	44.90	43.65	42.50	286
29	46.75	46.10	44.00	42.55	41.40	360
30	46.75	46.00	43.85	42.35	41.25	205
Oct.						
1	....	....	....	....	....	....
2	....	....	....	....	....	....
3	46.75	44.50	41.60	40.25	38.85	293
4	45.50	45.25	42.40	41.15	39.85	310
5	44.25	43.50	40.05	39.10	37.80	461
6	44.25	43.25	40.85	39.45	38.15	345
7	44.75	43.85	41.70	40.30	39.15	421

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.44¼
October	.44¼
November	.44¼
Thin Latex Crepe:	
Spot	.46¼
Thin Brown Crepe, No. 2	.36
Flat Bark Crepe	.31½

London Market

(Standard Smoked Sheets)

December	42.88 - 43.17
Jan.-Mar.	42.15 - 42.30

Singapore Market

(Standard Smoked Sheets)

November	42.15 - 42.22

Middling Upland Quotations

	Sept.6	October 7		
	Close	High	Low	Close
October	33.55	32.50	32.01	32.48
December	33.54	31.91	31.71	31.86
March	33.26	30.91	30.69	30.80

Notes and Quotes

In a recent address before a management meeting of B. F. Goodrich Canada, Ltd., Dr. F. K. Schoenfeld, vice-president in charge of research for the B. F. Goodrich Co., Akron, Ohio, observed that the growing world demand for rubber can only be supplied by increasing the production of synthetic rubbers. Without the present facilities for producing synthetic rubber in the United States and Canada, Dr. Schoenfeld said, the world would be short at least 1,000,000 long tons of rubber this year. In recognition of the fact that it requires about seven years for new rubber trees to produce, the Goodrich executive noted that any plantings made now will contribute little to world needs for rubber by 1960 at which time it is estimated that consumption will exceed 3,000,000 long tons of new rubber. He said that increasing demands for rubber must be made up, as they are now, by expanding facilities for the production of synthetic. Natural rubber, he said, is now about double the price of synthetic although natural can be produced at a considerably lower price than any presently-known synthetic rubbers.

Synthetic Rubber

Many in the trade would not be too surprised to see an increase in the export price of synthetic rubber in the very near future. It is held by some that an export price increase in the neighborhood of 3c a pound would do much to stimulate the desire of domestic producers to sell abroad. It is further held that a price increase of this size would not deter foreign purchasers.

Many observers state that now is the time when foreign consumers would be very much interested in acquiring U. S. synthetic, particularly because of the wide price difference between synthetic and natural rubber. As a matter of fact, the trade reports that any number of export orders for synthetic rubber in recent months have not been satisfied because sellers have been reluctant to make commitments under present conditions.

Influence of Prices

With the price of natural moving downward, some quarters express the opinion that synthetic producers may have missed an opportunity to impress upon foreign consumers the fact that a constant source for rubber is available at stable price levels. If the price of natural continues to move down to where the net price to the importer is not too different from that of synthetic, it is a virtual certainty that preference will be given to natural in view of the dollar situation, historical precedence, etc.

If greater quantities of U. S. synthetic rubber were available to foreign consumers, it holds that greater quantities of natural rubber would be available to the U. S. market. As it stands now, however, foreign consumers and their U. S. counterparts have reached a stalemate which might only be broken by an export price increase.

Synthetic Rubber Research

As noted elsewhere in this issue, the 11-member commission set by the National Science Foundation to evaluate the future of the nation's synthetic rubber research program recently held its first meeting. The commission faces some knotty problems—and foremost among these is the issue of national security. Although out of the synthetic rubber business, the government retains a lively interest in synthetic rubber research with the objective of making the United States independent of natural rubber.

The government has already invested a good deal of money in the effort to develop a good synthetic rubber truck tire. Understandably, it wants guarantees or some degree of control to insure that the work paid for by this investment will continue. Rubber companies, on the other hand, believe that normal competition will be sufficient to keep this work going at a fast pace.

The second big problem facing the commission is what to do with the synthetic rubber research laboratory and pilot plant now being operated for the government by the University of Akron. The issue would be resolved by reorganizing the research center on a paying basis for sponsored investigations.

As a preliminary step in this direction, the National Science Foundation has asked the University to contract with two companies for pilot projects. After a fee schedule is arrived at, the National Science Foundation plans an industry-wide survey of potential demand for the laboratory's services.

PRICES OF COMMERCIALLY AVAILABLE SYNTHETIC RUBBER POLYMERS

(dry types—per pound carload unless otherwise specified)

Butadiene-Acrylonitrile Types

Butaprene NAA	.5400 [2]
Butaprene NF	.4900 [2]
Butaprene NL	.5000 [2]
Butaprene NXM	.5800 [2]
Chemigum N1	.6400 [2]
Chemigum N3	.5800 [2]
Chemigum N5	.5800 [2]
Chemigum N6	.5000 [2]
Chemigum N7	.5000 [2]
Hycar OR-15	.5800 [2]
Hycar OR-25	.5000 [2]
Paracril B	.5000 [2]
Paracril BJ	.5000 [2]
Paracril C	.5800 [2]
Polysar Krynac	.5000 [2]
Polysar Krynac 801	.5800 [2]
Polysar SS-250-K	.3000 [2]

Butadiene-Styrene Types

ASRC 1500	.2410 [2]
ASRC 1502	.2410 [2]
Baytown 1600	.1850 [2]
Baytown 1601	.1850 [2]
Baytown 1602	.1850 [2]
Baytown 1801	.1700 [2]
Butaprene S-1000	.2300 [2]
Butaprene S-1001	.2300 [2]
Butaprene S-1004	.2300 [2]
Butaprene S-1005	.2800 [2]
Butaprene S-1006	.2300 [2]
Butaprene S-1009	.2455 [2]
Butaprene S-1010	.2450 [2]
Butaprene S-1012	.2700 [2]
Butaprene S-1013	.2500 [2]
Butaprene S-1014	.2700 [2]
Butaprene S-1015	.2800 [2]
Butaprene S-1500	.2300 [2]
Butaprene S-1502	.2300 [2]
Butaprene S-1703	.1950 [2]
Butaprene S-1705	.1925 [2]
Butaprene S-1710	.1775 [2]
Butaprene S-1712	.1775 [2]
Copo 1500	.2410 [2]
Copo 1502	.2410 [2]
Copo 1712	.1712 [2]
G-G 1001	.2410 [2]
G-G 1002	.2435 [2]
G-G 1006	.2410 [2]
G-G 1500	.2410 [2]
G-G 1501	.2410 [2]
G-G 1502	.2410 [2]
G-G 1703	.2060 [2]
G-G 1705	.2035 [2]
G-G 1706	.2035 [2]
G-G 1707	.1910 [2]
G-G 1709	.1885 [2]
G-G 1710	.1885 [2]
G-G 1711	.1885 [2]
G-G 1712	.1885 [2]
Hycar OS-10	.5500 [2]
Naugapol 1016	.2550 [2]
Naugapol 1018	.2600 [2]
Naugapol 1019	.2550 [2]
Naugapol 1021	.2900 [2]
Naugapol 1022	.2600 [2]
Naugapol 1023	.2650 [2]
Naugapol 1503	.2550 [2]
Naugapol 1504	.2650 [2]
Philprene 1000	.2500 [1]
Philprene 1001	.2500 [1]
Philprene 1006	.2500 [2]
Philprene 1009	.2550 [2]
Philprene 1018	.2575 [2]
Philprene 1019	.2525 [2]
Philprene 1100	.1990 [2]
Philprene 1104	.1940 [2]
Philprene 1500	.2500 [1]
Philprene 1502	.2500 [1]
Philprene 1503	.2525 [1]
Philprene 1600	.2000 [1]
Philprene 1601	.2000 [1]
Philprene 1602	.2000 [1]
Philprene 1605	.1940 [1]
Philprene 1703	.2120 [1]
Philprene 1706	.2100 [1]
Philprene 1708	.1970 [1]
Philprene 1711	.1940 [1]
Philprene 1712	.1940 [1]
Philprene 1803	.1800 [1]
Plioflex 1000	.2425 [2]
Plioflex 1006	.2425 [2]
Plioflex 1502	.2425 [2]
Plioflex 1703	.2075 [2]
Plioflex 1710	.1900 [2]
Polysar Krynol	.1890 [2]
Polysar Krynol NS	.1940 [2]
Polysar "S" Types	.2300 [2]
S-1000	.2300 [2]
S-1001	.2300 [2]
S-1002	.2325 [2]
S-1006	.2300 [2]
S-1011	.2325 [2]
S-1013	.2325 [2]
S-1100	.1850 [2]
S-1500	.2300 [2]
S-1501	.2300 [2]
S-1502	.2300 [2]
S-1600	.1850 [2]
S-1601	.1850 [2]
S-1602	.1850 [2]
S-1703	.1950 [2]
S-1705	.1925 [2]
S-1706	.1925 [2]
S-1707	.1800 [2]
S-1709	.1775 [2]
S-1712	.1775 [2]
S-1801	.1700 [2]
Synpol 1000	.2425 [3]
Synpol 1001	.2425 [3]
Synpol 1002	.2450 [3]
Synpol 1006	.2425 [3]
Synpol 1007	.2425 [3]
Synpol 1009	.2475 [3]
Synpol 1012	.2425 [3]
Synpol 1013	.2500 [3]
Synpol 1500	.2425 [3]
Synpol 1551	.2425 [3]
Synpol 1703	.2075 [3]
Synpol 1707	.1925 [3]
Synpol 1708	.1950 [3]
Synpol 1710	.1900 [3]
Synpol 1711	.1900 [3]

Butyl Rubbers

Enjay Butyl 035	.2300 [2]
Enjay Butyl 150	.2300 [2]
Enjay Butyl 165 NS	.2400 [2]
Enjay Butyl 215	.2300 [2]
Enjay Butyl 217	.2300 [2]
Enjay Butyl 218	.2300 [2]
Enjay Butyl 268 NS	.2400 [2]
Enjay Butyl 325	.2300 [2]
Enjay Butyl 365 NS	.2400 [2]
Polysar Butyl Types	.2300 [2]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [2]
Neoprene Type GN	.4100 [2]
Neoprene Type GN-A	.4100 [2]
Neoprene Type GRT	.4200 [2]
Neoprene Type KNR	.7500 [2]
Neoprene Type S	.4200 [2]
Neoprene Type W	.3900 [2]
Neoprene Type WRT	.4500 [2]

Silicone Rubbers

	(prices l.c.l.)
GE (compounded)	2.50 [2]
GE Silicone Gum (not compounded)	4.00 [2]
Silastic (compounded)	1.95 [2]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.4700 [2]
Thiokol Type FA	.6400 [2]
Thiokol PR-1	.9500 [2]
Thiokol Type ST	1.00 [2]

(latices—all prices per pound dry weight)

Butadiene-Acrylonitrile Types

Chemigum 200	.4900 [2]
Chemigum 235	.5400 [2]
Chemigum 236	.5400 [2]
Chemigum 245	.4600 [2]
Chemigum 246	.4600 [2]
Hycar 1512	.4600 [2]
Hycar 1551	.5400 [2]
Hycar 1552	.4600 [2]
Hycar 1561	.5400 [2]
Hycar 1562	.4600 [2]
Hycar 1571	.5900 [2]
Hycar 1572	.5100 [2]
Hycar 1577	.4600 [2]

Butadiene-Styrene Types

Butaprene S-2000	.2600 [2]
Butaprene S-2001	.2600 [2]
Butaprene S-2002	.2850 [2]
Butaprene S-2003	.2950 [2]
Butaprene S-2004	.2950 [2]
Butaprene S-2006	.2600 [2]
Copo 2101	.2800 [2]
Copo 2102	.3100 [2]
Copo 2105	.3100 [2]
Copo X-765	.2900 [2]
Pliolite 2101	.3000 [2]
Pliolite 2104	.3200 [2]
Pliolite 2105	.3200 [2]
Pliolite X-765	.3000 [2]
Naugatex 2000	.2630 [2]
Naugatex 2001	.2630 [2]
Naugatex 2002	.2880 [2]
Naugatex 2005	.3000 [2]
Naugatex 2006	.2630 [2]
Naugatex 2101	.2850 [2]
Naugatex 2105	.3120 [2]
Naugatex X-767	.3230 [2]
S 2000	.2275 [2]
S 2004	.2600 [2]
S 2101	.2250 [2]

Neoprene

Neoprene Latex 571	.3700 [2]
Neoprene Latex 572	.3900 [2]
Neoprene Latex 601-A	.4000 [2]
Neoprene Latex 735	.3800 [2]
Neoprene Latex 736	.3800 [2]
Neoprene Latex 842-A	.3700 [2]
Neoprene Latex 950	.4700 [2]

Polysulfide Rubbers

Thiokol Type MX	.7000 [2]
Thiokol Type WD-2	.9200 [2]
Thiokol Type WD-6	.7000 [2]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid.

Interested in Rubber Statistics—Markets—Prices?
Keep Abreast of the Changing Scene by Reading
RUBBER AGE
101 West 31st Street, New York 1, N. Y.

MARKETS

NEWS-PRICES

NEW YORK, OCTOBER 7, 1955

Reclaimed Rubber

The trade reports that all facilities of reclaim producers are running at or near capacity. Not only is the normal demand good, but the fact that one reclaimer was forced to temporarily withdraw from the market stimulated activity in other facilities. It is expected that the high level of activity will continue at least through the end of the current year and perhaps even for a few months beyond.

There have been some price adjustments in the price of reclaim during the past period running to an average of about 5%. Increased cost of raw materials and labor forced the price rises, reclaimers state. The prices of many grades of reclaim had previously remained unchanged for months and in some cases, years.

The Commerce Department reports that in the first eight months of this year, 214,375 long tons of reclaim were produced, compared with 162,635 long tons in the first eight months of 1954. In the first eight months of 1955, 210,073 long tons were consumed, compared with 160,158 long tons in the first eight months of 1954.

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.11
First Line Whole Tire	.10½
Second Line Whole Tire	.10
Third Line Whole Tire	.09¾
Fourth Line Whole Tire	.09¼
Black Carcass	.14¾
No. 1 Light Colored Carcass	.20¾
No. 1 Peel	.11
Butyl Tube Reclaim	.16
Natural Rubber Black Tube	.15
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

Scrap rubber exports in the first half of this year exceeded those in the corresponding period of 1954 according to figures released by the Bureau of the Census, U. S. Department of Commerce. For the January-June period of 1955, the exports of scrap rubber came to 17,345,942 pounds valued at $578,734, or 3,631,970 pounds more than the shipments of 13,713,972 pounds worth $353,891 made in the first half of the preceding year.

Trade quarters indicate that the gain reflected more normal purchases from overseas buyers rather than increased demand. Exporters assert that buying by foreign consumers in the first half of 1954 was below normal due to lack of dollar exchange plus the availability of scrap rubber closer to home and at more attractive prices. Current scrap rubber prices follow:

(Prices Delivered Akron)

Mixed tires	ton	17.00
Light colored carcass	lb.	.05½
No. 1 peelings	ton	45.00
No. 2 peelings	ton	30.00
No. 3 peelings	ton	24.00
Buffings	ton	17.00
Truck and Bus S.A.G.	ton	17.00
Passenger S.A.G.	ton	15.00
Natural Rubber Red Tubes	lb.	.08
Natural Rubber Black Tubes	lb.	.06
Butyl Rubber Tubes	lb.	.07½

Tire Fabrics

According to a recent survey by E. I. du Pont de Nemours & Co., Inc., twice as many persons are riding on nylon cord tires today, as were a year ago. DuPont states that acceptance of nylon as the superior reinforcing material for tires is indicated even more spectacularly by reports from the industry. Just a year ago, there were 39 brands of nylon cord tires on the market. Today, there are 241—an increase of more than 500%. Every tire manufacturer now has nylon cord among its lines of both passenger and truck tires.

DuPont reports that every one of the nation's major commercial airlines is 100% on nylon cord tires. Nylon has replaced rayon in virtually all off-the-road tires because of its tremendous strength and ability to take bumps over just about any kind of terrain without bruise damage.

Near Capacity Production

American Enka Corp. reports that its production so far this year has averaged almost 94% of capacity, or close to 108,000,000 pounds annually. John E. Bassill, president, stated that long range expectations in the fields of filament rayon yarns, rayon staple and nylon indicate continued improvement and expansion of the company's operations.

With regard to the outlook for rayon tire yarn and the increasing use of nylon in tires, Mr. Bassill referred to the fact that all of the nation's leading rayon producers have joined in a campaign conducted by the American Rayon Institute to educate the public about the high quality of rayon cord tires. He expressed the hope that this campaign and the development of super-strength yarns such as Enka's "Suprenka" will help rayon hold a large proportion of the tire market.

Other industrial uses of high tenacity rayon yarns are very promising, he indicated. "The company already has a substantial market for high tenacity yarn to be used in such products as industrial hose, belts, and carpet backing. Considerable effort is being made to develop entirely new end uses."

Rayon Shipments Rise

During August, U. S. producers of rayon and acetate shipped a total of 107,500,000 pounds of yarn, staple and tow, a figure 14% greater than July and 19% above the 90,100,000 pounds shipped in August, 1954. The August shipments this year consisted of 106,000,000 pounds for domestic consumption and 1,500,000 pounds for export. Shipments of rayon and acetate over the first eight months of 1955 have aggregated 845,300,000 pounds, 19% greater than in the same period of 1954.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.76½
1650	lb.	.73½
2200	lb.	.73

Nylon Tire Cord

210	lb.	2.00
840	lb.	2.00

Rayon Graded Fabric

1100	lb.	.72
1650	lb.	.69½
2200	lb.	.68½

Cotton Chafers

14.4 oz. (per square yard)	lb.	.70
9.25 oz. (per square yard)	lb.	.65
11.65 oz. (per square yard)	lb.	.61
8.9 oz. (per square yard)	lb.	.67

Liquid Latex

Natural: Buyers were reluctant to purchase Hevea concentrated latex during the past month at prices over 54c according to Latex & Rubber, Inc. However, in comparison with August, there were demands in the market. Once the need for latex had been determined by the typical consumer, and the price was within reach, both "forward" and "nearby" latex was purchased.

It is reported that most indecision results from uncertainty as to actual requirements. Many in the trade are certain that more latex would be consumed if the price were more favorable. The high price of latex has also caused many purchasers to purchase sparingly. A late September price dip caused an upsurge in buying, indicating that purchasers were watching the market closely.

Hevea latex prices during September ranged from 56⅛ to 60½c for ASTM Centrifuged Hevea latex, rail tank car quantities, f.o.b. cars, East Coast port. A general feeling persists that lower price levels will prevail in the first half of the next year.

Synthetic: Current prices for GR-S type latices currently range between 26 to 32.3c per pound total dry solids in rail tank cars, f.o.b. producing plant. It is expected that these prices will hold until the end of the year at which time some reappraisal of the situation would seem to be in order.

According to the Department of Commerce, 43,151 long tons of GR-S type latex were produced in the first eight months of this year and 38,483 long tons consumed. In the first eight months of this year, 6,550 long tons of neoprene latex and 7,111 of N-type latex were produced, while 5,764 long tons of neoprene latex and 5,133 long tons of N-type latex were consumed.

Cotton

The price of middling uplands on the New York Cotton Exchange has moved in a range of 195 points since our last report (September 6), high for the period being 34.25c reached on September 8 and again on September 9, and low being 32.30c reached on October 3. The average price of middling uplands for the month of September was 33.85c based on 21 trading days. This compares with an average of 34.53c in August.

The declines registered in the market during the past period were attributed to the movement of a large crop to market. The crop is reported to be larger than the September 1st indication of 12,873,000 bales. Prices dropped far under the loan level, which brought about a relatively tight situation in near months.

According to trade and government sources the present farm program for cotton is proving itself completely inadequate as a weapon to battle the cotton surplus problem. Steadily increasing yields have nullified production controls, these sources state.

Cotton producers are now in the second year of controls. Yet, the nation now has more cotton than it had before the production controls were started. Many in the trade believe that this figure is likely to increase even further. It is believed that a third year of production controls is inevitable and that these controls will be the most severe since the program went into effect.

WHITLEY COLLINS

Portrait by Fabian Bachrach

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Rubber Age

CURRENT MARKET PRICES

of rubber chemicals and compounding ingredients

OCTOBER 7, 1955

Prices are, in general, f.o.b. works and cover the domestic markets only. Export prices, as a rule, are usually slightly higher, due to packing regulations, special handling, etc.

Abbreviations: bbls., barrels; c.l., carload; cyl., cylinder; dlvd., delivered; dms., drums; eqld., equalized; l.c.l., less than carload; M.B. masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

***Trademark. †For Export Only.**

The arrangement of this section closely follows the Chemical Section of the 1953-54 RUBBER RED BOOK. Readers are referred to that edition for the correct classification of any material or brand name. Suppliers of every material are contacted for price information. However, only those materials are listed for which quotations have been furnished within the past six months. The quotations are not guaranteed and prospective purchasers should contact suppliers for information. Suppliers are requested to send current price information to the Market Editor, RUBBER AGE.

ACCELERATORS

A-1 (Thiocarbanilide)*	lb.	.50	.57
A-32*	lb.	.66	.80
A-100*	lb.	.52	.66
Accelerator No. 8*	lb.	——	1.10
Accelerator—49*	lb.	.55	.56
Accelerator 108*	lb.	——	.90
Accelerator—552*	lb.	——	2.25
Accelerator—808*	lb.	.66	.68
Accelerator—833*	lb.	1.17	1.19
Accelerator B*	lb.	——	.89
Altax*	lb.	.50	.52
Ancap*(†)	lb.	.38	.40
Ancatax*(†)	lb.	.48	.50
Ancazate BU (ET & ME)*(†)	lb.	——	1.04
Ancazide ET*(†)	lb.	——	1.04
ME*(†)	lb.	——	1.14
Arazate*	lb.	——	2.25
Beutene*	lb.	.66	.68
Bismate, Rodform*	lb.	——	3.00
Butazate*	lb.	——	1.04
Butyl Accelerator 21*	lb.	——	.90
Butyl Eight*	lb.	1.10	1.35
Captax*	lb.	.40	.42
C-P-B*	lb.	——	1.95
Cumate, Rodform*	lb.	——	1.45
Diorthotolylguanidine	lb.	.60	.61
Diphenylguanidine	lb.	.50	.51
El-Sixty*	lb.	.58	.65
Ethazate*	lb.	——	1.04
50D*	lb.	——	.85
Ethyl Thiurad*	lb.	——	1.04
Ethyl Tuex*	lb.	——	1.04
Ethylac*	lb.	.93	.95
Guantal*	lb.	.58	.65
Harvex*	lb.	.62	.68
Hepteen Base*	lb.	——	1.85
Kure-Blend MT*	lb.	——	.70
Ledate, Rodform*	lb.	——	1.04
MBT-XXX*	lb.	.51	.53
Merac*	lb.	.75	1.05
Mercaptobenzothiazole	lb.	.40	.42
Mercaptobenzothiazyl Disulfide	lb.	.48	.50
Mertax*	lb.	.51	.58
Methazate*	lb.	——	1.04
Monex*	lb.	——	1.14
Mono Thiurad*	lb.	——	1.14
Morfex*	lb.	.65	.67
2-MT	lb.	——	1.00
NA-22* (for neoprene)	lb.	——	1.20
NOBS No. 1*	lb.	.72	.74
Special*	lb.	.77	.79
O-X-A-F	lb.	.51	.53
Pentex*	lb.	——	1.04
Flour*	lb.	——	.21
Phenex*	lb.	.52	.57
Polyac*	lb.	——	1.80
R-2 Crystals*	lb.	——	4.35
Rotax*	lb.	.51	.53
RZ-50-A*	lb.	——	1.00
B*	lb.	——	1.00
SA 52*	lb.	——	1.14
SA 57*	lb.	——	1.04
SA 62*	lb.	——	1.04
SA 66*	lb.	——	3.25
SA 67*	lb.	——	1.04
SA 77*	lb.	——	1.04
Santocure*	lb.	.72	.79
Selenac* (Ethyl, Methyl)	lb.	——	2.75
Setsit-5*	lb.	.75	1.05
9*	lb.	.85	1.15
SPDX-GH*	lb.	.69	.71
GL*	lb.	1.20	1.30
Tellurac*	lb.	——	1.45
Tepidone*	lb.	.45	.48
Tetrone A*	lb.	——	1.91
Thiofide*	lb.	.50	.57
S*	lb.	.52	.59
Thionex*	lb.	——	1.14
Thiotax*	lb.	.40	.47
Thiurad*	lb.	——	1.14
Thiuram E*	lb.	——	1.04
M*	lb.	——	1.14
Trimene*	lb.	.56	.58
Base*	lb.	1.03	1.06
Tuads* (Ethyl)	lb.	——	1.04
Tuads* (Methyl)	lb.	——	1.14
Tuex*	lb.	——	1.14
Ultex*	lb.	1.00	1.10
Unads*	lb.	——	1.14
Vulcacure NB*	lb.	——	.45
ZB*	lb.	——	.85
ZE*	lb.	——	.85
ZM*	lb.	——	.85
Z-B-X*	lb.	——	2.45
Zenite*	lb.	.50	.52
A*	lb.	.59	.61
Zenite Special*	lb.	.51	.53
Zetax* (uncoated)	lb.	.51	.53
Zimate* (Butyl)	lb.	——	1.04
Zimate* (Ethyl)	lb.	——	1.04
Zimate* (Methyl)	lb.	——	1.04

ACTIVATORS

Blue Lead Sublimed (dlvd.)	lb.	.15¾	.16¾
Cottonseed Fatty Acids			
Wochem 210*	lb.	.15¼	.17¼
211*	lb.	.15¼	.17¼
Fish Oil, Hydrogenated, Fatty Acid			
DAR-S* (dlvd.)	lb.	.12	.14
DAR-HY* (dlvd.)	lb.	.13¾	.15¾
Hydrofol Acids* (dlvd.)	lb.	.12	.18¼
Hyfac 430* (dlvd.)	lb.	.16¼	.18½
Neo-Fat H.F.O.* (dlvd.)	lb.	.14½	.15¾
Neutrax* (dlvd.)	lb.	.15	.17
Stearex Beads* (dlvd.)	lb.	.09¾	.10¾
Stearite*	lb.	.12	.14
Talene* (dlvd.)	lb.	.14¾	.16¾
Lime, Hydrated			
Arrowhead*	ton	——	20.50
Marblehead*	ton	——	16.50
Sierra*	ton	——	22.00
Litharge			
Eagle-Picher*	lb.	——	.17½
SB* (dlvd.)	lb.	——	.17½
Magnesium Oxide, Heavy			
General Magnesite 500*	lb.	.05	.05½
600*	lb.	.06	.07
Michigan No. 15*	lb.	.06	.06½
Permanente MgO*	lb.	.057	.073
Magnesium Oxide, Light			
Baker's* (neoprene grade)	lb.	——	.26
Carey Mag*	lb.	.25¼	.26
General Magnesite* (neoprene grade)	lb.	.29¼	.30
General Magnesite No. 101*	lb.	.25¼	.28

ACTIVATORS (Cont'd)

Magnesium Oxide, Light (cont'd)			
Genmag ML*	lb.	.25¼	.28
195*	lb.	——	.20½
K & M*(neoprene grade)	lb.	.30	.34
Light Calcined Magnesia No. X-01*	lb.	.25¼	.26
Light Carbonate of Magnesia, Technical	lb.	.10½	.12
Maglite D*	lb.	.25¼	.26
M*	lb.	.29¼	.30
Marine's* (neoprene grade) (l.c.l.)	lb.	.29¼	.30
Michigan No. 30*	lb.	——	.26
Neomag Powder*	lb.	.29¼	.30
Pellets*	lb.	.31¼	.32
No. 40 Extra Light*	lb.	——	.30
Oleic Acid			
Emersol 210* (dlvd.)	lb.	.18	.20
L.C.P. Red Oil*	lb.	.18	.20
Neo-Fat 92-04*	lb.	.18	.19¾
94-04*	lb.	.15½	.17½
Palm Fatty Acids			
Wochem 280*	lb.	.14¼	.16¼
281*	lb.	.14¾	.16¾
Potassium Oleate (dms.)	lb.	.30	.73
Red Lead			
Eagle-Picher*	lb.	——	.18½
No. 2 RM* (dlvd.)	lb.	——	.18½
Sodium Laurate, 75%	lb.	.64	.89
Sodium Oleate, 75%	lb.	.54	.79
Paste (dms.)	lb.	.39	.64
Sodium Stearate, 75%	lb.	.54	.89
Stearic Acid, Single Pressed			
Emersol 110* (dlvd.)	lb.	.14¼	.16¼
Groco 53*	lb.	.14¼	.16¼
Neo-Fat 18-53*	lb.	.13¾	.14¾
Standard Pearlstearic* (dlvd.)	lb.	.14¼	.16¼
Wochem 730*	lb.	.12	.14
Stearex B* (dlvd.)	lb.	.15½	.16¾
Stearic Acid, Double Pressed			
Choice Pearlstearic* (dlvd.)	lb.	.14¾	.16¾
Emersol 120* (dlvd.)	lb.	.14¾	.16¾
Groco 54*	lb.	.14¾	.16¾
Neo-Fat 18-54*	lb.	.14¼	.15¼
Wochem 731*	lb.	.13¾	.15¾
Stearic Acid, Other			
Extra Pearlstearic* (dlvd.)	lb.	.17	.19
Neo-Fat 18*	lb.	.17½	.18½
18-58*	lb.	.12	.13
18-61*	lb.	.15¼	.16¼
Wochem 720*	lb.	.11¾	.13¾
721*	lb.	.11½	.13½
732*	lb.	.15½	.17½
White Lead Basic Carbonate	lb.	.18	.19
White Lead Basic Sulfate	lb.	.15¾	.16¾
Zinc Laurate			
Laurex*	lb.	.33	.34
Zinc Stearate	lb.	.39	.44
Zinc Stearate	lb.	.39	.44
Aquazinc K.C.*	lb.	.30	.55

Unclassified Activators

Actifat* (dms.)	lb.	——	.18
Aktone*	lb.	——	.25
Barak*	lb.	——	.62
Curade*	lb.	.57	.59
Dibenzo G-M-F	lb.	——	2.60
D-B-A*	lb.	——	1.95
G-M-F*	lb.	——	2.60
Dibutylamine (dlvd.)	lb.	.55	.56
MODX*	lb.	.32½	.34½
Ridacto* (dms.)	lb.	.25	.26
Snodotte* (dlvd.)	lb.	.18½	.20½
Vulklor*	lb.	.88	.98

ANTI-COAGULANTS

Aqua Ammonia* (dms.)	lb.	.031	.035
M.B.M.* (l.c.l.)	lb.	——	.35

ANTI-FOAMING AGENTS

Aero Anti Foam H*	lb.	——	.20
Regular*	lb.	——	.12
D.C. Antifoam A*	lb.	5.45	6.65
Antifoam A Emulsion*	lb.	2.05	4.00
Antifoam AF Emulsion*	lb.	2.05	2.85
Defoama W-1701*	lb.	——	.12½
Defoamer A-25*	lb.	——	3.00
Defoamer 630*	lb.	——	.12½
Deltyl Prime	lb.	.70	.80

SLICER MACHINE
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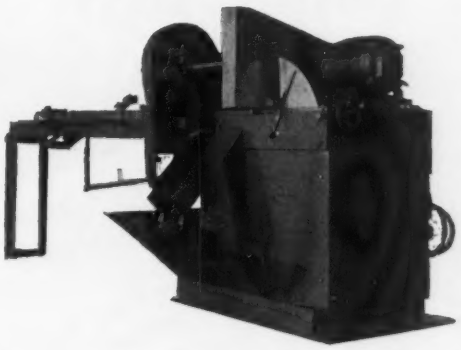

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Automatic Feed and Circulating Pump.
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A butadiene, styrene copolymer latex polymerized by a unique process that imparts high water resistance. It finds uses in paper laminates, carton and paper-to-foil adhesives; functional or decorative coatings on wood, plaster, fabrics, paper; as a saturant for masking tape, artificial leather, impregnated paper for wet abrasive operations, gaskets, etc.

*PATENT APPLIED FOR.

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ANTI-FOAMING AGENTS (Cont'd)

Emcol IM*	lb.	——	.60
G-E Antifoam SS-24*	lb.	5.80	6.90
SS-66*	lb.	5.70	6.20
Kessco X-3* (dms.)	lb.	——	.35½
X-180*	lb.	——	.29¾
X-181*	lb.	——	.38½
Nopco 1407*	lb.	.19½	.20½
1497-V*	lb.	.13¾	.14¾
1907-B*	lb.	.18¼	.19¼
JMK*	lb.	.48	.49
JMU*	lb.	.22½	.23½
JMY*	lb.	.19¼	.20¼
Pluronic L61*	lb.	.33½	.39
RS-968*	lb.	.38	.38½
Terpinol Prime No. 1	lb.	.35	.50
Tributyl Phosphate (dms.)	lb.	.52	.53

ANTIOXIDANTS

Agebest 1293-22A*	lb.	1.90	2.00
AgeRite Alba*	lb.	2.35	2.45
Gel*	lb.	.64	.66
Hipar*	lb.	.98	1.00
H.P.*	lb.	.72	.74
Powder*	lb.	.52	.54
Resin*	lb.	.75	.77
Resin D*	lb.	.52	.54
Spar*	lb.	.52	.54
Stalite*	lb.	.52	.54
Stalite S*	lb.	.52	.54
White*	lb.	1.45	1.55
Akroflex C*	lb.	.77	.79
CD*	lb.	.72	.74
Aminox*	lb.	.52	.54
Antioxidant 425*	lb.	2.47	2.50
Antioxidant 2246*	lb.	1.50	1.53
Antox*	lb.	.52	.54
Aranox*	lb.	——	3.25
Benzoquinone	lb.	1.50	1.75
Betanox Special*	lb.	.80	.82
B-L-E*	lb.	.52	.54
B-X-A*	lb.	.52	.54
Deenax*	lb.	.95	1.05
Di-tert-Butyl-para-Cresol	lb.	.91	.95
Eugenol C-95%*	lb.	2.30	2.50
Flectol H*	lb.	.52	.59
Flexamine*	lb.	.72	.74
Neozone A*	lb.	.56	.58
C*	lb.	——	.80
D*	lb.	.52	.54
Octamine*	lb.	.52	.54
Oxidex*	lb.	——	3.60
PDA-10*	lb.	.46	.48
Permalux*	lb.	——	2.17
Polygard*	lb.	.52	.54
Santoflex AW*	lb.	.78	.85
B*	lb.	.52	.59
BX*	lb.	.63	.70
DD*	lb.	.52	.59
35*	lb.	.72	.79
75*	lb.	.92	.99
Santovar-A*	lb.	1.50	1.57
Santowhite Crystals*	lb.	1.60	1.67
Santowhite L*	lb.	.52	.59
MK*	lb.	1.29	1.36
Powder*	lb.	1.60	1.67
Sequestrene AA*	lb.	——	.97½
NA2*	lb.	——	.79½
NA3*	lb.	——	.77½
Stabilite*	lb.	.55	.57
Alba*	lb.	.72	.77
FLX*	lb.	——	.65
L*	lb.	.60	.62
White*	lb.	.52	.54
White Powder*	lb.	.41	.43
Stabilizer No. 1*	lb.	1.55	1.80
Stabilizer No. 9-A*	lb.	.80	1.05
Styphen I*	lb.	.51	.55
Sunolite*	lb.	.21	.23
Tannic Acid, Tech.	lb.	.46	.48
Thermoflex A*	lb.	.98	1.00
V-G-B*	lb.	.70	.72
Wing-Stay S*	lb.	.51	.52

ANTI-SCORCHING AGENTS

Armeen HT*	lb.	.31	.33
Good-rite Vultrol*	lb.	.62	.64
Harcopol 1183*	lb.	.70	.74
Sodium Acetate 60-62% Crystals	lb.	.08	.08½

ANTISEPTICS AND GERMICIDES

Arquad S*	lb.	.24	.26
Formaldehyde (dms.)	lb.	.052	.068
G-4* (bbls.)	lb.	1.04	1.19
G-11*	lb.	2.20	2.30
Halane*	lb.	.50	.60
Nuodex 100 S.S.* (dlvd.)	lb.	——	1.10
100 W.D.* (dlvd.)	lb.	——	1.25
Zinc 8%* (dms.) (dlvd.)	lb.	.24	.28
Ortho Cresol (26°—27°)	lb.	.14	.156
Retarder D*	lb.	.42	.50
Soligen Drier—Copper 8%* (dms.)	lb.	.20¼	.21½
Zinc 8%* (dms.)	lb.	.22½	.23½
Vancide*	lb.	——	.80

ANTI-WEBBING AGENTS (for Latex)

DC 7 Compound*	lb.	5.13	6.50
Webnix 34*	lb.	1.50	2.25

AROMATICS (DEODORANTS)

Airkem 115*	gal.	——	6.50
122*	gal.	——	6.50
186*	gal.	——	6.50
Alamask AA*	lb.	——	3.00
AF*	lb.	——	2.50
AO*	lb.	——	1.50
AR*	lb.	——	.50
BG*	lb.	——	1.15
BGM*	lb.	——	.60
CY*	lb.	——	2.40
DI*	lb.	——	3.35
DL*	lb.	——	1.95
H*	lb.	——	5.50
LD*	lb.	——	.75
ND*	lb.	——	2.75
O*	lb.	——	6.50
OS*	lb.	——	5.25
Bouquet 149*	lb.	——	3.00
Coumarin*	lb.	2.95	3.00
Curodex 19*	lb.	4.75	4.90
188*	lb.	5.75	5.90
198*	lb.	6.75	6.90
Deodorant 65*	lb.	——	1.85
Deodorant L-37*	lb.	2.00	2.40
L-44*	lb.	2.50	2.90
N.L.T.X.*	lb.	1.85	2.15
Deodorant Oil GD 3427*	lb.	1.70	2.00
GD 6422*	lb.	2.00	2.50
GD 6423*	lb.	1.60	1.90
GD 6575*	lb.	2.40	2.90
GD 31063*	lb.	2.25	2.75
Ethavan*	lb.	6.75	6.80
Latex Perfume 5*	lb.	——	3.25
6*	lb.	——	7.50
9*	lb.	——	1.25
Naugaromes* (dms.)	lb.	.60	3.00
Neutroleum Delta*	lb.	——	2.60
Gamma*	lb.	——	3.60
Parador A*	lb.	2.00	2.50
C*	lb.	2.75	3.25
E*	lb.	.25	.55
GD 5280*	lb.	2.00	2.50
GD 5348*	lb.	1.90	3.25
Perfume Oil Bouquet Vanilla M*	lb.	2.40	2.75
Rodo No. 0*	lb.	4.00	4.50
No. 10*	lb.	5.00	5.50
Rubbarome* (dms.)	lb.	.60	3.80
Rubber Perfume 12*	lb.	——	4.35
Russian Leather 7*	lb.	——	4.35
Vanillin	lb.	3.00	3.25

BLOWING AGENTS

Ammonium Bicarbonate	cwt.	——	8.00
Better Blend Soda* (c.l., bags)	cwt.	——	2.40
Blowing Agent CP-975*	lb.	.32	.35
Celogen*	lb.	——	1.95
AZ*	lb.	——	1.95
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	——	2.30
Sponge Paste*	lb.	——	.20
Unicel*	lb.	——	.90
ND*	lb.	——	.76
S*	lb.	——	.20
Urea	lb.	.04¼	.04¾

BONDING AGENTS

Braze*	gal.	6.00	9.00
Cover Cement*	gal.	2.50	4.00
Durez 12987*	lb.	——	.54
Gen-Tac Latex*	lb.	.75	.85½
Hylene M*	lb.	3.50	3.75
M-50*	lb.	1.90	2.15
Penacolite B1A*	lb.	——	.95
R-2710*	lb.	——	.95
Pliobond 20*	gal.	2.91	4.23
30*	gal.	3.65	4.97
Rex Compounds*	gal.	1.30	1.90
Thixons*	gal.	3.30	9.00
Ty-Ply Q (BN & S)*	gal.	6.75	8.00
Tygobond 30*	gal.	5.50	7.45

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	9.00	11.00
Glacial 99½% (dms.)	lb.	.12	.13
Calcium Nitrate, Tech. Crystals	lb.	.12½	.15
Hydroxyacetic Acid—70% (dms.)	lb.	——	.084
Zinc Nitrate, Tech.	lb.	——	.22½

COLORING AGENTS

Black

Aquablak B*	lb.	.09¼	.09¾
M*	lb.	.08½	.09
R*	lb.	.10¾	.11¼
S*	lb.	.11½	.12
Black Shield 4-35* (dms.)	lb.	——	.09
Carbon Black See *Reinforcing Agents*			
Lampblack No. 10*	lb.	.06	.09
Mapico Black Iron Oxide* (50 lb. bags)	lb.	.13¼	.13½
Pure Black Iron Oxide	cwt.	12.75	13.00

COLORING AGENTS (Cont'd)

Blue

Blue Powders	lb.	2.30	5.00
Cooke M.B. Blue*	lb.	2.45	2.85
Milori Blue*	lb.	——	.46
Monastral Rubber Blue CPL*	lb.	——	1.95
PCD, Dispersed*	lb.	——	2.20
Peacoline Blue*	lb.	——	3.85
Ramapo Blue*	lb.	——	3.00
Rubber Blue GD* (Disp.)	lb.	——	4.55
Rubber Blue X-1999*	lb.	——	1.70
Rubber Dispersed Blues	lb.	2.52	2.78
Syntheline Blue*	lb.	——	3.85
Stan-Tone MBS*	lb.	1.55	4.55
GPE*	lb.	——	2.50
PC*	lb.	——	2.40
PDS*	lb.	——	2.00
PVC*	lb.	——	2.50
Ultramarine	lb.	.14	.30
Vansul Blue M.B.*	lb.	.90	2.60

Brown

Brown Iron Oxide	lb.	.12¾	.13
Mapico Brown* (50 lb. bags)	lb.	.14¼	.14½
Stan-Tone GPE*	lb.	——	3.00
Vansul Brown M.B.* (Organic)	lb.	——	2.10

Green

Cooke M.B. Green*	lb.	1.45	2.80
Filo Green*	lb.	——	.34
Green Chromium Oxide, Pure	lb.	——	.40¾
Green Chromium Oxide, Pure Hydrated	lb.	——	1.11
Green Powders	lb.	1.35	3.95
Monastral Rubber Green GSD* (Dispersed)	lb.	——	2.80
GSL*	lb.	——	2.20
Permansa Green CP-594*	lb.	——	1.35
Pigment Green B*	lb.	——	1.35
GL-652D*	lb.	.80	.90
Ramapo Green*	lb.	——	3.50
Rubber Dispersed Greens	lb.	1.23	3.08
Rubber Green FD* (Disp.)	lb.	——	2.05
Rubber Green X-1292*	lb.	——	1.40
Stan-Tone MBS*	lb.	1.55	3.35
GPE*	lb.	3.00	4.50
PC*	lb.	——	3.00
PDS*	lb.	1.90	2.20
PVC*	lb.	——	3.60
Vansul Green M.B.*	lb.	1.00	2.90

Maroon

Maroon Powders	lb.	.79	3.60
Stan-Tone MBS*	lb.	——	3.50
Vansul Maroon M.B.*	lb.	——	3.25

Orange

Molybdate Orange	lb.	——	.46½
Oswego Orange X2065*	lb.	——	3.00
Rubber Orange OD* (Disp.)	lb.	——	2.25
Stan-Tone GPE*	lb.	——	1.20
PC*	lb.	——	1.05
PDS*	lb.	——	1.20
PVC*	lb.	——	1.25
Vansul Orange M.B.*	lb.	2.00	2.50

Red

Antimony Trisulfide	lb.	.72	.78
R.M.P. Sulfur Free*	lb.	——	.78
R.M.P. No. 3*	lb.	——	.72
Cadmolith Red* (bbls.)	lb.	1.79	2.45
Cooke M.B. Red*	lb.	1.00	3.15
Graphic Red (dlvd.)	lb.	——	.79
Indian Red, American, Pure*	lb.	.12¾	.13
Doxco (English)*	lb.	.11½	.11¾
Kroma Reds*	lb.	.13	.15
Mapico Reds* (50 lb. bags)	lb.	.12¾	.13
Oximony Red Iron Oxide	lb.	.12¾	.13
Recco Red Oxide*	lb.	.12	.13
Red Iron Oxide, Light	lb.	.13	.13½
Red Powders	lb.	——	4.40
Rubber Dispersed Reds	lb.	1.47	3.58
Rubber Red PBD* (Disp.)	lb.	——	1.75
2BD, Dispersed*	lb.	——	1.80
2BL*	lb.	——	1.65
PBL*	lb.	——	1.65
Rubanox Red CP-762* (dlvd.)	lb.	——	1.40
Rubber Red CP-339* (dlvd.)	lb.	——	1.10
Rubber Red X-1148*	lb.	——	.85
Solfast Red*	lb.	1.50	1.95
Stan-Tone MBS*	lb.	1.20	3.53
GPE*	lb.	1.65	2.00
PC*	lb.	1.30	2.50
PDS*	lb.	1.40	1.55
PVC*	lb.	1.65	1.90
Sun Burnt Red*	lb.	.11½	.11¾
Vansul Red M.B.*	lb.	1.20	3.20
Watchung Red*	lb.	1.63	1.95

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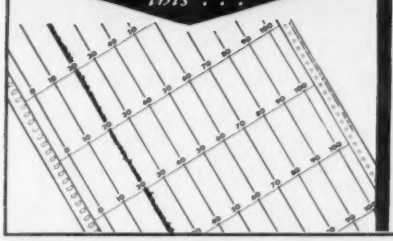

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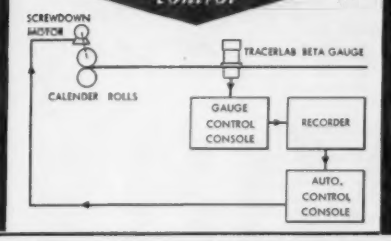

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COLORING AGENTS (Cont'd)

Tan

Mapico Tan 15* (50 lb. bags)	lb.	.20¾	.21
20* (50 lb. bags)	lb.	.20¼	.20½

White—Lithopone

Albalith*	lb.	.0750	.0850
Eagle-Picher*	lb.	.0750	.0825
Permolith*	lb.	.0750	.0825
Sunolith*	lb.	.0750	.0825

White—Titanium Pigments

Ti-Cal*	lb.	.08⅜	.09⅛
R-25*, R-22*, R-27*, R-30*	lb.	.08⅜	.08⅞
R-60*	lb.	.08⅜	.09⅛
Ti-Pure*	lb.	.22½	.25½
Anatase Grades*	lb.	.22½	.23½
Rutile Grades*	lb.	.24½	.25½
Titanox A*—all grades (dlvd.)	lb.	.22½	.23½
C-50* (dlvd)	lb.	.12⅞	.13⅜
RA* (dlvd.)	lb.	.24½	.25½
RA-10* (dlvd.)	lb.	.24½	.25½
RA-NC* (dlvd.)	lb.	.24½	.25½
RC* (dlvd.)	lb.	.08⅝	.09⅛
RC-HT* (dlvd.)	lb.	.08⅜	.08⅞
Unitane O-110*	lb.	.22½	.23½
O-210*	lb.	.22½	.23½
O-220*	lb.	.22½	.23½
O-310*	lb.	.22½	.23½
O-320*	lb.	.22½	.23½
O-410*	lb.	.22½	.23½
OR-150*	lb.	.24½	.25½
OR-250*	lb.	.24½	.25½
OR-340*	lb.	.24½	.25½
OR-342*	lb.	.24½	.25½
OR-350*	lb.	.24½	.25½
OR-540*	lb.	.24½	.25½
OR-640*	lb.	.24½	.25½
Zopaque*	lb.	.22½	.23½
R*	lb.	.24½	.25½

White—Zinc Oxide (American Process)

AZO-ZZZ 11* (22*, 33*, 44*, 55*)	lb.	.1400	.1500
Eagle-Picher AAA*	lb.	.1400	.1500
Horse Head Special*	lb.	.1400	.1500
XX*	lb.	.1400	.1500
Protox 166*	lb.	.1400	.1500
167*	lb.	.1400	.1500
St. Joe Black Label*	lb.	.1400	.1500
Green Label*	lb.	.1400	.1500
Red Label*	lb.	.1400	.1500

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	——	.13

White—Zinc Oxide (French Process)

AZO-ZZZ 66	lb.	.1400	.1500
Florence Green Seal*	lb.	.1575	.1675
Red Seal*	lb.	.1525	.1625
White Seal*	lb.	.1625	.1725
Kadox 25*	lb.	.1625	.1725
15*, 17*, 72* & 515*	lb.	.1400	.1500
Protox 168*	lb.	.1400	.1500
169*	lb.	.1400	.1500
U.S.P. (cartons)	lb.	.1725	.1825

White—Zinc Sulfide

Cryptone ZS*	lb.	.2530	.2630

Yellow

Benzidine Yellow	lb.	2.00	2.25
Cadmolith Yellow* (bbls.)	lb.	1.12	1.20
Chrome Yellow	lb.	——	.33½
Cooke M.B. Yellow 405*	lb.	1.90	2.00
Iron Oxide, Pure			
Light Shades	lb.	.11	.11¼
Dark Shades	lb.	.10½	.10¾
Mapico Yellow* (50 lb. bags)	lb.	.11	.11¾
Rubber Dispersed Yellows	lb.	1.27	2.13
Rubber Yellow GD* (disp.)	lb.	——	2.15
GL*	lb.	——	1.68
Rubber Yellow X-1940*	lb.	——	2.25
Stan-Tone MBS*	lb.	1.30	4.50
GPE*	lb.	2.00	4.50
PC*	lb.	.85	4.50
PDS*	lb.	1.25	1.75
PVC*	lb.	1.30	1.85
Sumatra Yellow X-1940*	lb.	——	2.25
Toluidine Yellow YL-660 D*	lb.	1.15	1.20
Oximony Iron Oxide	lb.	——	.06¾
Vansul Yellow M.B.*	lb.	.95	1.95
Yellow Powders	lb.	2.00	5.00
Zinc Yellow	lb.	——	.27½

DISPERSING AGENTS

Anchoid*(†)	lb.	.24	.25
Armeen 18*	lb.	.38	.40
Blancol*	lb.	——	.15¾
Darvan No. 1* (and No. 2*)	lb.	.22	.30
Daxad 11* (21*, 23*)	lb.	.08	.30
Diethanolamine (dms., dlvd.)	lb.	.24½	.27½
Dispersaid*	lb.	1.25	1.35
Emcol K-8300* (dms.)	lb.	.19	.20
Emulphor ON-870*	lb.	——	.55
Furala*	lb.	.06½	.07½
Halloid*	lb.	.04½	.05½
Igepal CO-630*	lb.	——	.29
Igepon T-73*	lb.	——	.29½
Kyro EO* (dms.)	lb.	——	.29¾
Leonil SA*	lb.	——	.55
Lomar PW*	lb.	——	.18
Marasperse C*	lb.	.06¼	.06¾
CB*	lb.	.12¼	.13¼
N*	lb.	.09½	.10½
Monoethanolamine (dms., dlvd.)	lb.	.25	.27¾
Nekal BA-75*	lb.	——	.40
BX-76*	lb.	——	.64
Nopco 1187-X*	lb.	.15	.16
Pluronic F68*	lb.	.38	.44
R & R 551*	lb.	——	.28
Rubbex*	lb.	.267	.285
Stablex B*	lb.	.50	.95
Stan-Chem BQC*	lb.	.12¼	.17¼
1067*	lb.	——	.13½
1471*	lb.	.1687	.2187
2251*	lb.	.12¼	.17¼
Trenamine D-25*	lb.	.32½	.36
Triethanolamine (dms., dlvd.)	lb.	.21½	.24½
U-3051*	lb.	——	.148
Yelkin TT*	lb.	.13	.16
TTS*	lb.	.13	.16

EXTENDERS

Advagum 1098*	lb.	——	.64
Arcco 1071-13B*	lb.	.14½	.15½
1073-18B*	lb.	.13½	.14½
1294-36B*	lb.	.11½	.12½
Car-Bel-Ex-A* (and B*)	lb.	——	.14
Extender 600*	lb.	——	.1765
Millex*	lb.	——	.07
W*	lb.	——	.07
Nopco 2271*	lb.	.15½	.16½
Polyco 418*	lb.	.17	.18
PR-162 Latex Extender*	lb.	——	.182
Synprolac*	lb.	.16	.23
Synprowax*	lb.	——	.23
Vistanex*	lb.	——	.45

FILLERS (Inert and Reinforcing)

Abrasives			
Carbonite*	lb.	.20	1.33
Lionite*	lb.	.14½	1.25
Pumice	lb.	.03	.05
Walnut Shell Grits	lb.	.05	.08
Aluminum Hydrate	lb.	.08	.11
Kaiser Alumina*	lb.	.026	.059
Aluminum Silicate			
Aluminum Flake*	ton	23.50	30.00
Marter White*	ton	18.50	30.00
Barium Carbonate (l.c.l.)	ton	95.50	100.00
Barytes			
No. 1 Floated, White*	ton	41.35	60.10
No. 2 Floated, Un-bleached*	ton	39.35	58.10
No. 22 Barytes* (c.l.)	ton	——	25.00
No. 3805 Barytes*	ton	22.00	26.75
Foam A*	ton	——	41.35
Spearmite*	ton	75.00	80.00
XIOR*	ton	75.00	80.00
Bentonite (c.l.)	ton	——	13.50
Argosite Clay* (c.l.)	ton	——	12.50
Bennett Clay* (c.l.)	ton	——	32.50
SPV Volclay* (c.l.)	ton	——	12.50
White Hi-Gel*	ton	——	65.90
Blanc Fixe	ton	72.50	120.00
Calcium Carbonate			
Atomite* (c.l.)	ton	——	30.00
B.I. White No. 1 (c.l.)	ton	——	9.00
Calcene NC*	ton	72.50	92.50
TM*	ton	75.00	95.00
Calwhite*	ton	——	17.00
Camel-Carb*	ton	——	10.00
Camel-Tex*	ton	——	18.00
Camel-Wite*	ton	——	30.00
Duramite*	ton	——	15.00
Gamaso*	ton	——	30 00
Kalite*	ton	50.00	65.00
Keystone White*	ton	——	16.00
Laminar*	ton	——	30.00
Lesamite* (c.l.)	ton	——	27.50
Lorite*	ton	30.00	35.00
Millical*	ton	35.00	50.00
Multifex*	ton	140.00	155.00
MM*	ton	110.00	125.00
Non-Fer-Al*	ton	30.00	45.00
Purecal M*	ton	56.75	80.75
SC*	ton	110.00	125.00
T*	ton	110.00	125.00
U*	ton	120.00	135.00
Rambo No. 1*	ton	——	9.50
Sierracal*	ton	15.00	18.50

FILLERS (Cont'd)

Calcium Carbonate (cont'd)			
Snowflake*	ton	17.00	18.00
Super Multifex*	ton	160.00	175.00
Surfex*	ton	35.00	50.00
Suspenso*	ton	33.00	48.00
Witcarb Reg.*	ton	56.75	85.00
P*	ton	110.00	140.00
R*	ton	120.00	150.00
RC*	ton	110.00	140.00
York White*	ton	——	9.50
Calcium Silicate			
Silene EF*	ton	120.00	140.00
Calcium Sulfate, Anhydrous			
Snow White Filler*	ton	——	20.50
Calcium Sulfate Hydrous			
Terra Alba No. 1*	ton	——	16.00
Chalk Whiting (l.c.l.)	lb.	.01½	.01¾
Recco Paris Whiting*	ton	——	33.00
OMYA Whiting*	ton	——	30.00
Clay			
Afton Clay*	ton	11.00	30.00
Aiken Clay*	ton	——	14.00
Alsilite* (c.l.)	ton	30.00	45.00
Alsite* (c.l.)	ton	——	14.00
Aluminum Flake*	ton	23.50	30.00
Buca* (c.l.)	ton	——	45.00
Burgess No. 20*	ton	——	35.00
No. 30*	ton	——	37.00
Burges Iceberg*	ton	——	50.00
Catalpo* (c.l.)	ton	——	35.00
Champion*	ton	——	14.00
C.S.D.* (c.l.)	ton	——	13.50
Crown*	ton	——	14.00
Dixie* (c.l.)	ton	——	14.00
Franklin Clay—R* (c.l.)	ton	13.50	30.00
Harwick Clays*	ton	18.50	57.00
Hi-White R*	ton	——	13.50
Kalloid Clay* (c.l.)	ton	——	10.50
LGB*	ton	——	17.00
LGP*	ton	——	19.00
McNamee* (c.l.)	ton	——	13.50
Paragon*	ton	——	13.50
Pigment 5*	ton	23.50	26.50
33*	ton	——	37.00
Recco* (c.l.)	ton	——	14.00
Swanee Clay*	ton	——	12.50
Snobrite*	ton	——	12.50
Suprex*	ton	——	14.00
Whitetex* (c.l.)	ton	——	50.00
Windsor Clay* (c.l.)	ton	14.00	30.00
Diatomaceous Earth	ton	30.00	50.00
Kaylorite* (c.l.)	ton	——	30.00
Lorite*	ton	——	30.00
Flock			
Cotton (White)	lb.	.11	.28
Colored	lb.	.11	.19
Filfloc F 40-9000*	lb.	——	.13
F 6000*	lb.	——	.36
Polycel*	ton	110.00	210.00
Rayon, Bleached or Dyed	lb.	.80	1.25
Rayon, Grey	lb.	——	.18
Rayon, Pink	lb.	——	.20
Solka-Floc* (l.c.l.)	lb.	.07	.16
Glue, Amber	lb.	.16	.18
Leather			
Flour (dust)	lb.	.12	.15
Shredded	lb.	.05	.17
Lignin	lb.	.06	.08
Indulin*	lb.	.06	.08
Limestone, Pulverized	ton	3.00	5.50
Asbestol Regular*	ton	25.00	27.00
Asbestol Superfine*	ton	30.00	32.00
Georgia Marble No. 10*	ton	——	10.00
Industrial Filler No. 100*	ton	——	5.75
Micro Velva A*	ton	49.00	51.00
L*	ton	57.00	59.00
No. 1 White*	ton	——	10.00
Magnesium Carbonate	lb.	.10½	.14½
K & M Clearcarb*	lb.	——	.14
Technical* (c.l., eqld.)	lb.	.10½	.12
Magnesium Oxide			
Magnesite*	lb.	.057	.073
Magnesium Silicate (see Talc)			
Mica	lb.	.01¼	.07¾
Concord*	lb.	.07½	.08¼
Micro-Mica*	lb.	.07½	.08¼
Mineralite* (c.l.)	ton	40.00	85.00
Silversheen*	lb.	.07½	.08¼
Triple A Mica* (c.l.)	ton	——	25.00
Vermiculite*	lb.	——	.11
Wet Ground Biotite Mica	lb.	.06	.06¾
Wet Ground Mica No. 160*	lb.	.07½	.08¼
Pyrophyllite			
No. 261*	ton	——	11.50
Pyrax A* (c.l.)	ton	——	13.50
WA* (c.l.)	ton	——	16.00
Sawdust, Graded	ton	14.00	35.00
Silica	ton	16.00	27.00
Slate, Powdered (l.c.l.)	ton	15.00	20.00
Lo-Micron Slate Flour*	lb.	——	.04½
No. 133 Slate Flour*	ton	——	4.55
Sodium Silico Aluminate			
Zeolex 23*	ton	120.00	140.00
Talc (Magnesium Silicate)			
Asbestol Regular*	ton	——	25.00
Eastern RC-500*	ton	——	30.00
No. 41*	ton	——	17.70
No. 549*	ton	——	63.00
French*	ton	——	59.00
L.S. Silver*	ton	29.25	34.25
No. 367*	ton	——	13.00
No. 1600*	ton	——	70.60
No. 1768*	ton	——	13.00

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FILLERS (Cont'd)

Talc (cont'd)			
Nytal 200*	ton	——	- 27.00
300*	ton	——	- 37.00
Sierra White*	ton	25.75	- 30.75
Soapstone*	ton	——	- 13.00
Walnut Shell Flour	ton	55.00	-100.00
Stan-Shell*	ton	80.00	-100.00
Whiting, Commercial	ton	——	- 7.00
Allied Whiting*	ton	9.50	- 20.00
Camel-Carb*	ton	——	- 10.00
C-C-O White*	ton	——	- 19.00
Georgia Marble No. 15*	ton	——	- 15.00
No. 16*	ton	——	- 16.00
Keystone* (c.l.)	ton	——	- 16.00
Piqua No. 1 YAA* (c.l.)	ton	——	- 9.00
No. 2 LS* (c.l.)	ton	——	- 9.00
Snowflake* (c.l.)	ton	17.00	- 18.00
Stan-White 325*	ton	8.50	- 11.10
Veroc* (c.l.)	ton	——	- 9.50
Welco* (c.l.)	ton	——	- 9.50
York White R* (c.l.)	ton	——	- 9.00
Wood Flour	ton	25.50	- 48.00

FINISHING MATERIALS, SURFACE

Beaco Finishes*	gal.	2.10	- 2.35
Black Out*	gal.	4.50	- 8.00
Shellac, Orange Gum	lb.	.50	- .60
VanWax*	gal.	1.45	- 1.50

FLAME RETARDANTS

Celluflex CEF* (dms.)	lb.	——	- .65
Chlorowax 70*	lb.	.18	- .19
Halowax*	lb.	.35½	- .61½
Zinc Borate 3167*	lb.	.1920	- .2020
Zyrox Compounds*	lb.	.38½	- .95½

LATEX MODIFIERS

Ludox	lb.	.15	- .16¾
OPD-101*	lb.	——	- .26

LUBRICANTS, MOLD

Akro Gel*	lb.	——	- .165
Alipal CO-433*	lb.	——	- .20
CO-436*	lb.	——	- .26
Aquadag*	lb.	3.50	- 4.00
Aquarex D*	lb.	——	- .78
L*	lb.	——	- .94
ME*	lb.	——	- .80
MDL*	lb.	——	- .33
WAQ*	lb.	——	- .22
Armid O*	lb.	.39	- .41
Borax, Granular (l.c.l.)	ton	89.00	- 94.00
Carbowax 4000*	lb.	.31	- .32
CD Mold Release A*	gal.	——	- 6.50
B*	gal.	——	- 5.00
Colite Concentrate* (dms.)	gal.	.90	- 1.15
Colite D43D*	gal.	1.15	- 1.40
Concentrex*	lb.	——	- .25
Dag Dispersions No. 197*	lb.	1.85	- 2.90
D.C. 7 Compound*	lb.	5.13	- 6.50
D.C. Emulsion No. 7*	lb.	1.59	- 2.07
No. 8*	lb.	1.36	- 1.80
No. 35*	lb.	1.36	- 2.50
No. 35A*	lb.	1.36	- 2.50
No. 35B*	lb.	1.36	- 2.50
No. 36*	lb.	1.36	- 2.50
D.C. Mold Release Fluid*	lb.	3.39	- 4.75
Dri-Lube*	lb.	——	- .22
G-E Silicone Fluid SF-92*	lb.	3.39	- 5.00
G-E Silicone Emulsion SM-33*	lb.	1.36	- 1.55
SM-61*	lb.	1.36	- 1.55
Glydag G*	lb.	1.30	- 2.45
Hawkeye Flake* (dlvd.)	lb.	.14¾	- .15½
HSC No. 35*	lb.	1.36	- 1.48
Igepal CO-430*	lb.	——	- .29
CO-530*	lb.	——	- .29
CO-630*	lb.	——	- .29
Igepon AP-78*	lb.	——	- .48
T-51*	lb.	——	- .13½
Kokobace R*	lb.	.17½	- .18½
Linde Silicone L-45*	lb.	3.41	- 4.75
LE-45*	lb.	1.36	- 2.50
Lubri-Flo*	gal.	10.00	- 12.00
Migralube*	lb.	——	- .35
ML-1027-2C*	gal.	——	- .15
ML-1028-2C*	gal.	——	- 2.15
Mold Lubricant No. 72 Conc.* (dms.)	gal.	——	- 1.90
No. 735* (dms.)	gal.	——	- 1.25
No. 769* (dms.)	gal.	——	- 1.20
No. 856* (dms.)	gal.	——	- 1.90
No. 880* (dms.)	gal.	——	- 1.12
No. 935* (dms.)	gal.	——	- 1.64
No. 980* (dms.)	gal.	——	- 1.60
Moldeze No. 3*	gal.	5.00	- 6.00
Mold-Brite*	gal.	——	- 1.50
Monopole Oil MD*	lb.	——	- .16
Olate Flakes*	lb.	.22¼	- .23¼
Orvus WA Paste* (dms.)	lb.	——	- .23
Polyglycol 15-200*	lb.	.25	- .28¾
E4000*	lb.	.31	- .37
Prodag*	lb.	.28	- .42
Purity Flake* (dlvd.)	lb.	.17¾	- .18½
Rubber-Flo*	gal.	1.25	- 2.00

LUBRICANTS, MOLD (Cont'd)

Rubber-Glo*	gal.	——	- .94
Rusco Mold Paste*	lb.	——	- .25
Sericite* (l.c.l.)	ton	65.00	- 75.00
SF-92 Silicone Fluid*	lb.	3.70	- 4.22
SM-33 Silicone Emulsion*	lb.	1.50	- 1.68
55*	lb.	1.46	- 2.00
61*	lb.	1.56	- 1.68
Thermalube*	lb.	——	- .13¾
Ucon Lubricants*	lb.	.26¾	- .27¾
Ulco Mold Soap*	lb.	.12	- .23

LUBRICANTS, RUBBER

Diglycol Stearate Neutral (and SE) (dms.)	lb.	——	- .25
Emcol DS-50*	lb.	——	- .38
RDH-S*	lb.	——	- .27
Extrud-o-Lube*	gal.	——	- 1.54
G.B. Naphthenic Neutrals*	gal.	.11	- .18
Ivory Chips*	lb.	.18¾	- .19¾
Latex-Lube GR* (dlvd.)	lb.	.19¼	- .20
No. 82-A* (450 lb. dms.)	lb.	——	- .08½
Propylene Stearate (dms.)	lb.	.35	- .60

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	.39	- .44
Calcium Stearate	lb.	.37	- .42
D.C. 4 Compound*	lb.	5.13	- 6.50
D.C. 200 Fluid*	lb.	3.39	- 4.75
ELA*	lb.	——	- .82
G-E Silicone Fluid SF-92*	lb.	3.39	- 5.00
Glycerized Lubricant*	gal.	——	- 1.48
Glydag B*	lb.	1.50	- 2.10
G*	lb.	1.30	- 2.45
Hydro-Zinc*	lb.	——	- .20
Latex-Lube Pigmented* (dlvd.)	lb.	.17¼	- .18¼
R-66*	lb.	——	- .16½
Liqui-Lube* (dlvd.)	lb.	——	- .16¼
N.F.* (dlvd.)	lb.	——	- .16¾
N.T.* (dlvd.)	lb.	——	- .16¾
Polyethylene Glycol	lb.	.22	- .26
Rubber Free (Concentrate)*	gal.	——	- 1.44
Jel*	lb.	.18	- .21½
Slab-Dip*	lb.	——	- .15
Stock-Lube*	lb.	——	- .19
Zinc Stearate	lb.	.39	- .44

MOLD CLEANERS

Actusol* (dlvd.)	gal.	1.45	- 1.65
Alkon* (dlvd.)	lb.	.16	- .16½
CA-301*	gal.	——	- 2.29
CA-302*	gal.	——	- 2.63
Metso Anhydrous*	cwt.	5.10	- 7.35
Metso 99*	cwt.	4.60	- 6.85
200*	cwt.	6.00	- 8.25
Granular*	cwt.	4.10	- 6.35
Orvus Extra Granules*	lb.	.22½	- .23½
Rubber-Sol*	gal.	2.97	- 3.97
Sprex A.C.* (dlvd.)	lb.	.17¾	- .18¾

PEPTIZING AGENTS

Peptizer P-12*	lb.	.95	- 1.25
Pepton 22 Plasticizer*	lb.	.79	- .82
RPA 2*	lb.	——	- .78
3*	lb.	——	- .47
3 Conc.*	lb.	——	- .83
5*	lb.	——	- .59
6*	lb.	——	- 1.58

PLASTICIZERS & SOFTENERS

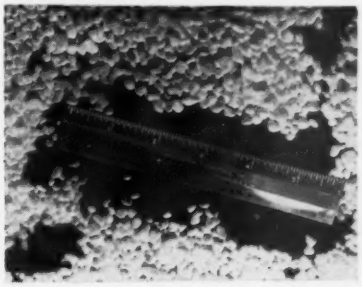
Acto 500*	lb.	——	- .09
Adipol BCA* (dms.)	lb.	.47	- .47½
2EH*	lb.	.43½	- .46½
10A*	lb.	.43½	- .46½
ODY*	lb.	.48	- .51
810*	lb.	.43½	- .46½
XX*	lb.	.43½	- .46½
American Pine Tar Oil*	lb.	.0438	- .0712
Arneel*	lb.	.27	- .39
Arolene 1980* (c.l.)	lb.	——	- .10
Aromatic Plasticizer 10* (and 25*) (dms.)	lb.	.05	- .06¼
Aromatic Tar	gal.	.0573	- .1973
Bardol*	lb.	.02¾	- .03¾
B*	lb.	.06¼	- .06½
Bayol D*	gal.	——	- .382
F*	gal.	——	- .52
Beeswax, Bleached	lb.	.72	- .75
Yellow Refined	lb.	.70	- .90
Bondogen*	lb.	.53	- .60
B.R.C. No. 20*	lb.	.0150	- .0175
B.R.H. 2*	lb.	.0213	- .0351
BRS 700*	lb.	.0200	- .0285
B.K.T. 3*	lb.	.0180	- .0265
4*	lb.	.0250	- .0260
7*	lb.	.0300	- .0310
B.R.V.*	lb.	.0475	- .0565
Bunarex Resins*	lb.	.07	- .08

PLASTICIZERS & SOFTENERS (Cont'd)

Bunatak AH*	lb.	——	- .09½
N*	lb.	——	- .31
U*	lb.	——	- .17½
No. 90*	lb.	——	- .09
No. 210*	lb.	——	- .14
Burgundy Pitch*	lb.	.0843	- .0888
Butac*	lb.	.11¾	- .12¾
BxDC (dms.)	lb.	.40	- .41
Butyl Carbitol Perlargonate (dms.)	lb.	——	- .64½
Butyl Cellosolve Perlargonate (dms.)	lb.	——	- .68
Butyl Oleate	lb.	.23¼	- .26
Butyl Palmitate	lb.	——	- .26½
Butyl Stearate (dms.)	lb.	.23	- .25
BWH-1*	lb.	.16	- .17
Cabflex DDA*	lb.	.42½	- .45½
DDP*	lb.	.30½	- .33½
Di-BA*	lb.	.43¼	- .46¼
Di-OA*	lb.	.42½	- .45½
Di-OP*	lb.	.30½	- .33½
Di-OZ*	lb.	.48	- .50¾
DOA*	lb.	.42½	- .45½
DOP*	lb.	.30½	- .33½
HS-10	lb.	.44	- .47
ODA*	lb.	.42½	- .45½
ODP*	lb.	.30½	- .33½
TCP*	lb.	.33	- .36
Califlux 510* (and 550*)	lb.	.02½	- .03¼
G.P.*	lb.	.01¼	- .02
R-100*	lb.	.04½	- .05¼
TT*	lb.	.0170	- .0245
Candelilla Wax, Prime	lb.	.62	- .64
Refined Light	lb.	.63	- .65
Carbowax 4000* (dms.)	lb.	.31	- .32
Cardolite 615*	lb.	.33¾	- .36¾
816*	lb.	.25¾	- .28¾
Carnauba Wax, Crude	lb.	.66	- .68
Flaked	lb.	.75	- 1.20
Refined, Technical	lb.	.69	- .74
Refined, Pure	lb.	.75	- .80
Yellow	lb.	1.03	- 1.10
Celluflex* (dms.) 112* (t.c., dlvd.)	lb.	——	- .33
179-A* (t.c., dlvd.)	lb.	——	- .33
179-C* (t.c., dlvd.)	lb.	——	- .33
179-EG* (t.c., dlvd.)	lb.	——	- .33
DBP* (t.c., dlvd.)	lb.	——	- .30
DOP* (t.c., dlvd.)	lb.	——	- .30½
TPP* (dms., eqld.)	lb.	——	- .40
Ceresin Wax	lb.	.11½	- .28
White and Yellow	lb.	.14½	- .22
Chlorowax 40*	lb.	.14½	- .15½
CTLA Polymer*	gal.	.20	- .36
Cumar Resins*	lb.	.06½	- .17
Darex DBP*	lb.	.33	- .35¾
DOP*	lb.	.34	- .37
DIOP*	lb.	.34	- .37
D.B.M.*	lb.	.32	- .34¾
Degras, Common	lb.	——	- .14
Diallyl Phthalate (dms.)	lb.	.51½	- .52¼
Dibenzyl Sebacate	lb.	.88	- .89½
Dibutoxyethyl Sebacate	lb.	——	- .56¾
Dibutyl Phthalate	lb.	.30	- .32
Dibutyl Sebacate	lb.	.64	- .65½
Dicapryl Adipate	lb.	.43	- .45
Dicapryl Phthalate	lb.	.29½	- .31½
Dicapryl Sebacate	lb.	.58	- .59½
Di-Carbitol Phthalate (dms.)	lb.	.42	- .42½
Dicyclohexyl Phthalate	lb.	.59	- .60
Diethyl Phthalate (t.c.)	lb.	.25	- .27¾
Di-2-ethylhexyl Phthalate	lb.	——	- .30½
Dihexyl Adipate	lb.	.42	- .44
Dihexyl Phthalate	lb.	.30	- .32
Dihexyl Sebacate	lb.	.62	- .63½
Diisobutyl Azelate	lb.	——	- .47¾
Di-iso-octyl Adipate (dms.)	lb.	.42½	- .44½
Di-iso-octyl Phthalate (t.c.)	lb.	.30½	- .32½
Dimethyl Phthalate (t.c.)	lb.	.27½	- .30¾
Dimethyl Sebacate	lb.	1.25	- 1.26½
Dinopol 235*	lb.	.33½	- .36½
IDO*	lb.	.30½	- .33½
MOP*	lb.	.32	- .35
Dioctyl Phthalate (dms.)	lb.	.30½	- .32½
Dioctyl Sebacate (dms.)	lb.	.58	- .59½
D.I.O.P. (dms.)	lb.	.30½	- .33½
Dipolymer Oil	gal.	.33	- .48
Dispersing Oil No. 10*	lb.	.06	- .06¼
Dutrex 6*	gal.	——	- .11
15E*	gal.	——	- .10
Elastex 10-P*	lb.	.30½	- .33½
50-B*	lb.	.25	- .28
DCHP*	lb.	.59	- .60
Emulphor EL-719*	lb.	——	- .62
Estac*	lb.	——	- .16
Ethox* (dms.)	lb.	.45	- .45½
Flexol B-400*	lb.	.27	- .28
DOP*	lb.	.32½	- .33½
TOF*	lb.	.45½	- .46½
3GH*	lb.	.45½	- .46
3GO*	lb.	.54½	- .55
4GO*	lb.	.34½	- .35½
426*	lb.	.27	- .30
Flexricin P-1*	lb.	——	- .32
P-4*	lb.	——	- .31
P-6*	lb.	——	- .37
P-8*	lb.	——	- .33
Fortex* (dms.)	lb.	.12½	- .14½
Galex W-100*	lb.	.15½	- .19¼
G.B. Asphaltic Flux*	gal.	.08	- .14
G.B. Light Process Oil*	lb.	.02½	- .03¼
Medium Process Oil*	lb.	.03½	- .04¼
G.B. Naphthenic Neutrals*	gal.	.11	- .18
Good-rite GP233*	lb.	.44¾	- .47¾
GP261*	lb.	.34	- .37

To Eliminate Dust and Cut Costs

IN NEOPRENE COMPOUNDING



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The new Model RB-2 has a maximum cutting thickness of two inches, weighs 44.5 pounds, and is available in both A.C. and D.C. types. Manually operated, the machine is capable of cutting up to 20,000 feet of rubber strip in eight hours. A series of slits in the edge of the cutting blade carries water from a reservoir into the cut and not just to the top of the rubber being cut. This method lubricates the entire cut and produces a straight and even edge.

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Manufacturers of a Complete Line of Cloth Cutting Machinery

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LEADERS IN THE FIELD For RESEARCH and MANUFACTURING DEPENDABILITY

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PLASTICIZERS & SOFTENERS (Cont'd)

Harflex 500* (dms.)	lb.	.31½ -	.33½
Herron-H.T.*	gal.	.16 -	.27
Herron-Plas*	lb.	—— -	.03¾
Herron-Wax*	lb.	.05¼ -	.06
No. 23*	lb.	.08¼ -	.08¾
No. 24*	lb.	.07¼ -	.07¾
HSC No. 13*	lb.	.27 -	.30
Indonex 632½* (633½*, 634½*, 637½*)	gal.	.11 -	.17
Kapsol*	lb.	.32¼ -	.35¼
Kenflex*	lb.	.18 -	.27
Kesscoflex 101* (dms.)	lb.	—— -	.39
102* (dms.)	lb.	—— -	.32½
103* (dms.)	lb.	—— -	.41½
104* (dms.)	lb.	—— -	.48
105* (dms.)	lb.	—— -	.33¼
106* (dms.)	lb.	—— -	.35½
108* (dms.)	lb.	—— -	.37
109* (dms.)	lb.	—— -	.36¼
KP 23* (dms.)	lb.	.29 -	.32
90* (dms.)	lb.	.40 -	.43
140* (dms.)	lb.	.48 -	.48½
201* (dms.)	lb.	.58¼ -	.59¼
220* (dms.)	lb.	.31 -	.34
555* (dms.)	lb.	.33¼ -	.33¾
Kremol 40*	gal.	.36 -	.46
50*	gal.	.39 -	.49
Kronisol* (dms.)	lb.	.33 -	.35½
Kronitex AA* (dms.)	lb.	.33 -	.36
I* (dms.)	lb.	.33 -	.36
K-3*	lb.	.33 -	.36
MX*	lb.	.33 -	.36
Lanolin, Tech. Anhydrous	lb.	—— -	.28
Lead Oleate	lb.	—— -	.30½
Lindol* (dms., t.c.)	lb.	.33 -	.36
2-Mercaptoethanol (dms.)	lb.	1.25 -	1.50
Methox*	lb.	.35¼ -	.37¾
Methyl Laurate	lb.	.25 -	.27
Methyl Oleate	lb.	—— -	.20
Methyl Stearate (dms.)	lb.	—— -	.30
Monoplex S-71*	lb.	.46½ -	.47½
Montan Wax, Crude	lb.	.13½ -	.15
Flaked	lb.	.18 -	.40
Morflex*	lb.	.32 -	.69½
MR 2088* (dms.)	lb.	—— -	.19
Natac*	lb.	.11¼ -	.12¼
Nebony Resins* (dms.)	lb.	.04 -	.04½
Neolene 210* (t.c.)	lb.	—— -	.16
212* (t.c.)	lb.	—— -	.14
220* (t.c.)	lb.	—— -	.15
Nerium*	lb.	—— -	.09
Nevillac Resins* (dms.)	lb.	.31 -	.85
Neville Resins* (dms.)	lb.	.12 -	.18
Nevindene Resins* (dms.)	lb.	.15 -	.18
Nevinol* (dms.)	lb.	—— -	.20
Nuba 1* (and 2*) (dms.)	lb.	.05¾ -	.06¼
3X* (dms.)	lb.	.07¾ -	.08¼
No. 480 Oil Proof Resin*	lb.	—— -	.18
Ohopex Q10* (dms.)	lb.	.29½ -	.32½
R9* (dms.)	lb.	.35½ -	.37¾
Opalwax	lb.	.37 -	.38
Ortho-Nitrobiphenyl	lb.	.13 -	.15
Ozokerite Wax, White and Yellow	lb.	.22 -	.43
Paradene Resins (dms.)	lb.	.06½ -	.07½
Para Flux* (dms.)	gal.	.19¼ -	.20¼
2016* (dms.)	gal.	.22 -	.23
Para Lube* (l.c.l.)	lb.	.046 -	.048
Paraplex G-60*	lb.	.35 -	.36
G-62*	lb.	.37½ -	.38½
Parmo*	lb.	.06 -	.13½
Pepton 22 Plasticizer*	lb.	.79 -	.82
PG-16*	lb.	—— -	.35
Philrich-5* (t.c.)	gal.	—— -	.11
Picco 10* (and 25*)	lb.	.15 -	.15½
60* (and 75*)	lb.	.14½ -	.15
100*	lb.	.13 -	.14
Piccocizer 30*	lb.	.05½ -	.07
Piccolastic A* (B*, C*, D* & E*)	lb.	.28 -	.29
FT* (FHF* & FN*)	lb.	.1815 -	.1965
T-135*	lb.	.22¾ -	.23¾
Piccolyte S Resins*	lb.	—— -	.2275
Piccopale Resins*	lb.	.086 -	.116
Piccoumaron Resins*	lb.	.06½ -	.18
Pigmentar*	lb.	.0427 -	.0712
Pigmentaroil*	lb.	.0427 -	.0712
Plastac M*	lb.	—— -	.09¼
Plasticizer 2286*	lb.	—— -	.26¼
Plasticizer 4141*	lb.	.56¾ -	.66¾
Plasticizer MP*	lb.	.0350 -	.0755
Plasticizer ODN*	lb.	.31 -	.37
Plasticizer SC*	lb.	.54 -	.55
Plasticizer W-13*	lb.	.37 -	.38¾
Plastoflex 3*	lb.	—— -	.52
50*	lb.	.34¼ -	.35¼
55*	lb.	.31 -	.32
520*	lb.	.37½ -	.38½
SP-2*	lb.	—— -	.43
VS*	lb.	.41¾ -	.42¾
Plastogen*	lb.	.07¾ -	.08
Plastolein 9050* (c.l.)	lb.	.53¼ -	.55½
9055*	lb.	.29¾ -	.31½
9058*	lb.	.49¾ -	.51½
9250*	lb.	.36 -	.37¾
9715*	lb.	.38¾ -	.40½
Plastone*	lb.	.27 -	.30
Polycizer 162*	lb.	.30½ -	.33½
332*	lb.	.43½ -	.46½
ED*	lb.	—— -	.56¾
Polyco 438*	lb.	.34 -	.35
Polymel C-130*	lb.	.19½ -	.20½
D*	lb.	.23½ -	.24½
6*	lb.	.05¾ -	.07¾
Process Oil C-255* (c.l.)	gal.	—— -	.22
Propylene Stearate (dms.)	lb.	—— -	.32

PLASTICIZERS & SOFTENERS (Cont'd)

PRR 1*	gal.	.15 -	.35
PT 67 Light Pine Oil* (dms.)	gal.	—— -	.60
101 Pine Tar Oil* (t.c., dms.)	gal.	.0427 -	.0601
400 Pine Tar* (600* & 800*) (t.c., dms.)	gal.	.0427 -	.0601
PX-104*	lb.	.32 -	.33
PX-108*	lb.	.32½ -	.33½
PX-138*	lb.	.32½ -	.33½
PX-208*	lb.	.44½ -	.45½
PX-238*	lb.	.44½ -	.45½
PX-404*	lb.	.68½ -	.69
PX-438*	lb.	.63½ -	.64
PX-917*	lb.	.35 -	.36
Reogen*	lb.	.13¼ -	.13½
465 Resin* (dms.)	lb.	.07 -	.07½
Resin 731-C*	cwt.	—— -	15.00
Resin C*	lb.	.0225 -	.0310
Resinex*	lb.	.04 -	.04½
L-4*	lb.	.03 -	.04¼
Rexflex*	lb.	—— -	.11
Rosin Oil	gal.	.54 -	1.20
R.S.O. Softening Oil*	lb.	.03 -	.05
Rubberol*	lb.	—— -	.25¾
Santicizer B-16*	lb.	.48¾ -	.49¾
E-15*	lb.	.52¾ -	.53¾
M-17*	lb.	.44¾ -	.45¾
No. 140*	lb.	.35 -	.36
No. 141*	lb.	.36 -	.37
No. 160*	lb.	.27 -	.28
No. 602*	lb.	—— -	.30½
No. 603*	lb.	—— -	.27
Sherolatt.m*	lb.	.03½ -	.06
Solarite Resin No. 11*	lb.	.16½ -	.22½
Staflex DBES*	lb.	.67½ -	.68½
DOS*	lb.	.68 -	.69
IXA*	lb.	.34 -	.35
KA*	lb.	.37¾ -	.38¾
Stanolind Petrolatum*	lb.	.053 -	.089
Wax*	lb.	.31 -	.33
Sunny South Burgundy Pitch*	lb.	.1005 -	.1060
Pine Tar Oil*	lb.	.0247 -	.0712
Rosin Oil*	gal.	.58 -	.87½
Superla Wax*	lb.	.34½ -	.44
Syncera Wax*	lb.	.23 -	.34
Syn Tac* (c.l.)	gal.	—— -	.33
Synthetic Revertant Oil	lb.	—— -	.16
Tar, Refined	gal.	.1200 -	.1760
Terpene A*	gal.	—— -	.65
TP-90B*	lb.	—— -	.59
TP-95*	lb.	—— -	.65
Transphalt Resins*	lb.	.02¼ -	.04¾
Triacetin	lb.	.43 -	.47
Tributyl Phosphate (dms.)	lb.	.52 -	.53
Tricresyl Phosphate (t.c.)	lb.	.33 -	.36
Turgum S*	lb.	.10 -	.11
Vanadiset B*	lb.	.03½ -	.06
C*	lb.	.03 -	.05¾
MR 80 Mesh*	lb.	.07¼ -	.10
Vistac No. 1*	gal.	1.00 -	1.21
P*	lb.	.18 -	.18½
Vopcolene 50*	lb.	—— -	.37
Witcizer 100*	lb.	.26 -	.27
200*	lb.	.19½ -	.20½
201*	lb.	.23½ -	.24½
300*	lb.	.30 -	.33
312*	lb.	.30½ -	.33½
313*	lb.	.30½ -	.33½
412*	lb.	.42½ -	.45½
Witresin*	ton	50.00 -	57.50

PROCESSING AIDS

Castor Oil, Blown (dms.)	lb.	—— -	.21
Refined (dms.)	lb.	—— -	.18½
Castorwax*	lb.	—— -	.24½
Dutrex 7*	lb.	.12 -	.20
ELA*	lb.	—— -	.82
Emcol MAS*	lb.	—— -	.44
Kenflex N*	lb.	—— -	.18
Millrex*	lb.	—— -	.15
Polycin 783*	lb.	—— -	.24½
Resin No. 510*	lb.	.15 -	.22
Pulverized*	lb.	.20½ -	.25
Zyrox*	lb.	.50 -	.79

PROTECTIVE & STABILIZING AGENTS

Acacia*	lb.	.12¾ -	.21
Alpha Protein	lb.	—— -	.23
Aroostocrat*	lb.	—— -	.07½
Carob Bean Flour	lb.	—— -	.30
Casein	lb.	.24 -	.31
Emcol K-8300* (dms.)	lb.	.19 -	.20
Ethylene Diamine 68%	lb.	.44 -	.47
Gum Arabic	lb.	—— -	.19
Karaya Gum	lb.	—— -	.25
Locust Bean Gum	lb.	—— -	.31
Prosein*	lb.	—— -	.06
Stablex B*	lb.	.50 -	.95
K*	lb.	.27 -	.35

RECLAIMING AGENTS

Amalgamator Z-4*	lb.	.32 -	.34
Armeen C*	lb.	.45 -	.47
Mixed Crude*	lb.	.17 -	.23
T*	lb.	.29 -	.31
Burco RA*	lb.	.05½ -	.08¼
C-6 Oil* (28* & 32*)	gal.	.33 -	.38

RECLAIMING AGENTS (Cont'd)

C-10 Oil*	gal.	.25 -	.30
C-33* (t.c.)	gal.	—— -	.21½
C-42* (t.c.)	gal.	—— -	.23
Caustic Soda—Flake 76% (c.l., dms.)	cwt.	—— -	4.25
Liquid 50% (t.c.)	cwt.	—— -	2.70
Solid 76% (c.l., dms.)	cwt.	—— -	3.85
Cresylic Acid (99-100%)	gal.	.80 -	.94
D-4* (t.c.)	gal.	—— -	.27
E-5* (t.c.)	gal.	—— -	.25
Flake Calcium Chloride (77-80%)	ton	—— -	27.00
G.B. Reclaiming Oil*	gal.	.12 -	.18
CD-10*	gal.	.10 -	.16
CD-50-U*	gal.	.18 -	.24
Gensol No. 6* (t.c.)	gal.	—— -	.40
Heavy Aromatic Naphtha	gal.	—— -	.13¼
LX-77 Reclaiming Solvent*	gal.	.21 -	.33
LX-572 Reclaiming Oil*	gal.	.27 -	.32
LX-777 Reclaiming Oil*	gal.	.23 -	.33
Neo-Fat D-242*	lb.	.05½ -	.07¾
No. 517 H.B. Oil*	gal.	.11½ -	.16½
535*	gal.	.22 -	.27
PT 67 Light Pine Oil* (dms.)	gal.	—— -	.60
PT 101 Pine Tar Oil* (t.c., dms.)	gal.	.0427 -	.0601
PT 150 Pine Solvents* (dms.)	gal.	—— -	.44
Q Oil* (t.c.)	gal.	—— -	.286
Reclaiming Oil 3186-G*	gal.	.25 -	.36½
Reclaiming Reagent No. 1431*	lb.	.21 -	.25
R.P.A. No. 3*	lb.	—— -	.47
RR-10*	lb.	—— -	.36
Soda Ash (c.l., bags)	cwt.	—— -	1.65
Solvent 534*	gal.	.20½ -	.26½
Solvent Oil 21*	gal.	.24 -	.29
C-42*	gal.	.23 -	.28
Union Solvent 4060-O*	gal	—— -	.184
X-1 Resinous Oil*	lb.	.0210 -	.0300

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98*	lb.	.0740 -	.1225
Continental F*	lb.	.0740 -	.1225
Croflex*	lb.	.0740 -	.1225
Dixiedensed (and S)*	lb.	.0740 -	.1225
HX Compact*	lb.	.0740 -	.1225
Kosmobile (and S)*	lb.	.0740 -	.1225
Micronex HPC*	lb.	.0740 -	.1225
Spheron 4*	lb.	.0740 -	.1225
Witco No. 6*	lb.	.0740 -	.1225

Channel, Medium Processing (MPC) (bags)

Atlantic MPC-95*	lb.	.0740 -	.1225
Collocarb*	lb.	—— -	.0625
Continental A*	lb.	.0740 -	.1225
Croflex TH*	lb.	.0740 -	.1225
Dixiedensed HM (and S-66)	lb.	.0740 -	.1225
Huber Arrow TX*	lb.	.0740 -	.1225
Kosmobile HM (and S-66)	lb.	.0740 -	.1225
Micronex Standard*	lb.	.0740 -	.1225
Spheron 6*	lb.	.0740 -	.1225
Texas M*	lb.	.0740 -	.1225
Witco No. 1*	lb.	.0740 -	.1225

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42*	lb.	.0740 -	.1225
Collocarb*	lb.	—— -	.0625
Continental AA*	lb.	.0740 -	.1225
Croflex 77*	lb.	.0740 -	.1225
Dixiedensed 77*	lb.	.0740 -	.1225
Kosmobile 77*	lb.	.0740 -	.1225
Micronex W-6*	lb.	.0740 -	.1225
Spheron 9*	lb.	.0740 -	.1225
Texas E*	lb.	.0740 -	.1225
Witco No. 12*	lb.	.0740 -	.1225
Wyex*	lb.	.0740 -	.1225

Channel, Conductive (CC) (bags)

Continental R-40*	lb.	.2300 -	.3000
Dixie 5 Dustless*	lb.	.1200 -	.1900
Dixie Voltex*	lb.	.2300 -	.3000
Kosmink Dustless*	lb.	.1200 -	.1900
Kosmos Voltex*	lb.	.2300 -	.3000
Spheron C*	lb.	.1400 -	.1850
Voltex*	lb.	.2300 -	.3000
Texas 109*	lb.	.0790 -	.1190

Channel, Surface Treated (STC) (bags)

Texas 109*	lb.	.0790 -	.1190

Conductive Furnace Black (CF) (bags)

Aromex 115*	lb.	.0890 -	.1290
Shawinigan Acetylene Black*	lb.	.1700 -	.2600
Vulcan C*	lb.	.1050 -	.1500

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- Better molding characteristics
- Excellent curing aid

MAGLITE-D*

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- Higher magnesium oxide content
- Easier incorporation into neoprene
- Less dust

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BE CAREFUL ABOUT TEMPERATURE

REJECTS ARE A TOTAL LOSS!

There is very little you can do with scorched rubber except charge it off to experience. Even with the rapid modern accelrators, scorching is avoidable. With the Cambridge Surface Pyrometer, the operator can check, thus contol the surface temperature of mill, warming and calender rolls. It is an accurate, rugged, quick-acting instrument, so easy to use that operators are glad to use it.

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Pioneer Manufacturers of Precision Instruments

CAMBRIDGE
ROLL • NEEDLE • MOLD
PYROMETERS

THEY HELP SAVE MONEY AND MAKE BETTER RUBBER

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace, Fast Extruding (FEF) (bags)

Arovel*	lb.	.0600 -	.1000
Collocarb*	lb.	— -	.0525
Continex FEF*	lb.	.0600 -	.1000
Croflex 50*	lb.	.0600 -	.1000
Dixie 50*	lb.	.0600 -	.1000
Kosmos 50*	lb.	.0600 -	.1000
Philblack A*	lb.	.0600 -	.1000
Statex M*	lb.	.0600 -	.1000
Sterling SO*	lb.	.0600 -	.1000

Furnace, Fine (FF) (bags)

Statex B*	lb.	.0650 -	.1050
Sterling 99*	lb.	.0650 -	.1050

Furnace, General Purpose (GPF) (bags)

Dixie 35*	lb.	.0500 -	.0900
Kosmos 35*	lb.	.0500 -	.0900
Sterling V*	lb.	.0500 -	.0900
V (Non-Staining)	lb.	.0500 -	.0900

Furnace, High Abrasion (HAF) (bags)

Aromex*	lb.	.0790 -	.1190
Collocarb*	lb.	— -	.0675
Continex HAF*	lb.	.0790 -	.1250
Croflex 60*	lb.	.0790 -	.1190
Dixie 60*	lb.	.0790 -	.1190
Kosmos 60*	lb.	.0790 -	.1190
Philblack O*	lb.	.0790 -	.1190
Statex R*	lb.	.0790 -	.1250
Vulcan 3*	lb.	.0790 -	.1250

Furnace, High Modulus (HMF) (bags)

Collocarb*	lb.	— -	.0525
Continex HMF*	lb.	.0550 -	.0950
Croflex 40*	lb.	.0550 -	.0950
Dixie 40*	lb.	.0550 -	.0950
Kosmos 40*	lb.	.0550 -	.0950
Modulex*	lb.	.0550 -	.0950
Statex 93*	lb.	.0550 -	.0950
930*	lb.	.0470 -	.0870
Sterling L*	lb.	.0550 -	.0950
LL*	lb.	.0550 -	.0950

Furnace, Semi-Reinforcing (SRF) (bags)

Collcarb*	lb.	— -	.0400
Continex SRF*	lb.	.0450 -	.0850
Croflex 20*	lb.	.0450 -	.0850
Dixie 20*	lb.	.0450 -	.0850
Essex*	lb.	.0450 -	.0850
Furnex*	lb.	.0475 -	.0875
Gastex*	lb.	.0525 -	.0925
Kosmos 20*	lb.	.0450 -	.0850
Pelletex*	lb.	.0475 -	.0875
NS*	lb.	.0475 -	.0875
Shawinigan Acetylene Black*	lb.	.1700 -	.2600
Sterling NS*	lb.	.0475 -	.0875
R*	lb.	.0525 -	.0925
S*	lb.	.0475 -	.0875

Furnace Super Abrasion (SAF) (bags)

Philblack E*	lb.	.1250 -	.1650
Vulcan 9*	lb.	.1250 -	.1680

Furnace, Super Abrasion, Intermediate (ISAF) (bags)

Aromex 125*	lb.	.1000 -	.1400
Continex ISAF*	lb.	.1000 -	.1450
Dixie 70*	lb.	.1000 -	.1450
Kosmos 70*	lb.	.1000 -	.1450
Philblack I*	lb.	.1000 -	.1400
Statex 125*	lb.	.1000 -	.1450
Vulcan 6*	lb.	.1000 -	.1450

Furnace, Super Conductive (SCF) (bags)

Vulcan SC*	lb.	.1800 -	.2230

Thermal, Fine (FT) (bags)

P-33 (c.l.)*	lb.	— -	.0550
Sterling FT (c.l.)*	lb.	— -	.0550

Thermal, Medium (MT) (bags)

Shellblack*(†)	lb.	— -	.0250
Sterling MT (c.l.)*	lb.	— -	.0400
MT Non-Staining (c.l.)*	lb.	— -	.0500
Thermax (c.l.)*	lb.	— -	.0400
Stainless (c.l.)	lb.	— -	.0500

REINFORCING AGENTS—SILICA

Cab-O-Sil (compressed)*	lb.	.68 -	.75
Cab-O-Sil (uncompressed)*	lb.	.68 -	.75
D. C. Silica (pelletized)*	lb.	.77 -	.81
Hi-Sil 101*	lb.	.10 -	.11½
233*	lb.	.09 -	.10½
X303*	lb.	.40 -	.45
Santocel*	lb.	.62 -	.64
Valron Estersil*	lb.	— -	1.00

REINFORCING AGENTS—MISCELLANEOUS

Angelo Shellac*	lb.	— -	.60
Darex Copolymer No. 3*	lb.	.47 -	.49
X34*	lb.	.42 -	.44
43G*	lb.	.39 -	.41
Darex Copolymer Latex No. 3-L (and X34L)*	lb.	.36½ -	.39
Durez 12687 (and 12707)*	lb.	— -	.37
Durez 13355*	lb.	— -	.28
Good-rite Resin 50*	lb.	.39 -	.41
Kralac A*	lb.	.43 -	.44
A-EP*	lb.	.40 -	.41
Lampblack	lb.	— -	.12
Marbon S and S-1*	lb.	.39 -	.41
8000*	lb.	.39 -	.41
Marmix*	lb.	.39 -	.41
Pliolite Latex 150*	lb.	.38 -	.39
Pliolite Resin-Rubber Masterbatches*	lb.	.38 -	.56
Pliolite NR*	lb.	.94 -	.95
S3 and S6*	lb.	.43 -	.44
S6B*	lb.	.39 -	.41
Plio-Tuf G75C*	lb.	.53 -	.54
G85C*	lb.	.53 -	.54
Polyco 220*	lb.	.18¼ -	.19¼
Polyfon*	lb.	.08 -	.09

RETARDERS

Benzoic Acid TBAO-2*	lb.	— -	.44
Dutch Boy Normasal*	lb.	— -	.46
ESEN*	lb.	.35 -	.37
Good-rite Vultrol*	lb.	.62 -	.64
Harcopol 1183*	lb.	.70 -	.74
Retarder J*	lb.	.62 -	.64
PD*	lb.	.35 -	.37
W*	lb.	— -	.45
Retardex*	lb.	.47 -	.50

RUBBER SUBSTITUTES

Mineral Rubber

M. R. No. 38*	ton	45.00 -	55.00
Black Diamond*	ton	45.00 -	55.00
Byerlyte*	ton	47.00 -	54.00
Hard Hydrocarbon (dms.)*	ton	46.50 -	48.50
Herron Flake*	ton	— -	45.00
Mineral Rubber, Solid	ton	42.50 -	44.50

Vulcanized Vegetable Oils

Amberex*	lb.	.29 -	.36
Brown*	lb.	.1310 -	.2200
Car-Bel-Lite*	lb.	.3300 -	.3600
Neophax*	lb.	.1570 -	.2680
White*	lb.	.1480 -	.2520

Miscellaneous Rubber Substitutes

G.B. Asphaltenes*	lb.	.06 -	.06½
Gilsowax B*	lb.	.09 -	.11
Resin No. 1098 (dms.)	lb.	— -	.62
No. 1198*	lb.	.46¾ -	.49¾

SOLVENTS

Acetone (dlvd.)	lb.	.07 -	.10
American DD Dipentine*	gal.	.30 -	.57
American DD Pine Oil*	lb.	.11¼ -	.13¼
Amsco Lactol Spirits* (t.c.)	gal.	— -	.19
Naphthol Spirits*	gal.	— -	.18
Mineral Spirits*	gal.	— -	.17
Rubber Solvent* (t.c.)	gal.	— -	.18
Solv A* (t.c.)	gal.	— -	.24½
Solv A-80* (t.c.)	gal.	— -	.30
Solv B* (t.c.)	gal.	— -	.29½
Solv B-90* (t.c.)	gal.	— -	.32
Solv D* (t.c.)	gal.	— -	.30
Solv E*	gal.	— -	.30
Solv F*	gal.	— -	.30
Solv F-80*	gal.	— -	.32½
Solv G*	gal.	— -	.42½
Special Naphtholite* (t.c.)	gal.	— -	.18
Special Textile Spirits*	gal.	— -	.19
Super Hi-Flash Naphtha*	gal.	— -	.45
Super Naphtholite*	gal.	— -	.18
Textile Spirits* (t.c.)	gal.	— -	.19
Amyl Chlorides, Mixed (l.c.l.) (dms.)	lb.	.09¼ -	.10¼
Benzol 90%	gal.	.36 -	.40
Butyl Acetate (t.c.)	lb.	.15 -	.16
Butyl Alcohol (t.c.)	lb.	.15 -	.16
Secondary (dlvd.)	lb.	.13 -	.15
Tertiary (dlvd.)	lb.	.14 -	.15
Carbon Bisulfide, Tech.	lb.	.0515 -	.08½
Carbon Tetrachloride	lb.	.08½ -	.10
Cosol 1*	gal.	.37 -	.43
2*	gal.	.42 -	.48
Cyclohexane	gal.	.70 -	.72
85% (t.c.)	gal.	— -	.36
Cyclohexanone	lb.	.25 -	.27
Diacetone, Pure (dlvd.)	lb.	.12 -	.15
Dichlorethyl Ether (dms.)	lb.	.14½ -	.15
Formal (dms.)	lb.	.30¾ -	.31¼
Dichloropentane	lb.	.04¼ -	.14¾
Dicom*	gal.	.30 -	.42
Halowax Oil*	lb.	.28 -	.41
Heptanes* (t.c.)	gal.	.17 -	.22
Hexanes (t.c.)	gal.	.17 -	.22

SOLVENTS (Cont'd)

Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.39 -	.59
Ether, Ref. (dlvd.)	lb.	.05 -	.08
Mersol*	gal.	.43 -	.79
Mesityl Oxide (dlvd.)	lb.	.11½ -	.14½
Methyl Acetone, Syn. (dms., dlvd.)	gal.	.57 -	.63
Methyl Ethyl Ketone	lb.	.11 -	.14
Methyl Isobutyl Ketone (dlvd.)	lb.	.13 -	.16
Methylene Chloride PRG	lb.	.11½ -	.13½
Tech.	lb.	.13½ -	.14½
N-5 Pentane Mix* (t.c.)	gal.	— -	.13½
N-6 Hexanes* (t.c.)	gal.	— -	.14½
N-7 Hexanes* (t.c.)	gal.	— -	.13½
Penetrell*	gal.	.30 -	.57
Petrolene* (t.c.)	gal.	— -	.14125
Picolines, Alpha, Refined	lb.	.43½ -	.44
Mixed	lb.	— -	.35
Proprietary Solvent (dms.)	gal.	.51 -	.72
Propyl Acetate (t.c., dlvd.)	lb.	— -	.10¾
Alcohol (t.c., dlvd.)	lb.	— -	.10
PT 150 Pine Solvent* (dms.)	gal.	— -	.44
Pyridine, Refined	lb.	— -	.75
Quinoline	lb.	.50 -	1.35
Rubber Solvent (t.c.)	gal.	— -	.16
Rubsol (t.c.)	gal.	— -	.12875
Skellysolve B (Hexanes)* (t.c.)	gal.	— -	.158
C (Heptanes)* (t.c.)	gal.	— -	.151
E (Octanes)* (t.c.)	gal.	— -	.165
R (Solvent Naphtha)*	gal.	— -	.129
Solvent, Crude, Light	gal.	.19 -	.28
Solvesso 100* (t.c.)	gal.	.33 -	.37
150 (t.c.)	gal.	.33 -	.37
Sunny South DD Dipentine*	gal.	.30 -	.57
Sunny South DD Pine Oil*	lb.	.11¼ -	.13¼
Sunray*	gal.	.1140 -	.1600
Toluene (dms.)	gal.	— -	.38
Toluol (t.c.)	gal.	— -	.34
Trichlorethane	lb.	.13 -	.13½
Triglycol Dichloride	lb.	.63 -	.64
Union Thinner 1* (dms.)	gal.	— -	.204
3* (dms.)	gal.	— -	.204
5* (dms.)	gal.	— -	.194
7* (t.c.)	gal.	— -	.159
2-50 W Hi-Flash*	gal.	— -	.41
Xylol	gal.	.34 -	.38

STABILIZING AGENTS (for Vinyl) Resins)

Advastab No. 21*	lb.	1.00 -	1.08
50-LT*	lb.	3.20 -	3.35
BC-105*	lb.	.75 -	.80
E-6-B*	lb.	.80 -	.85
L Paste	lb.	.65 -	.70
X23-74*	lb.	.70 -	.80
X30-15*	lb.	.65 -	.75
XE-82*	lb.	.85 -	.95
Barca 10*	lb.	— -	.80
Barium Ricinoleate (BVS)	lb.	— -	.70
Barium Stearate	lb.	.37 -	.42
Basic Silicate White Lead	lb.	.16¼ -	.17½
Cadmium Ricinoleate	lb.	— -	2.00
Calcium Ricinoleate	lb.	— -	.55
Dutch Boy DS-207*	lb.	— -	.54
Plumb-O-Sil A*	lb.	— -	.29¾
B*	lb.	— -	.31½
Tribase*	lb.	— -	.26½
Dythal*	lb.	— -	.39½
Ferro 120* (dms.)	lb.	.73¼ -	.83¼
121* (dms.)	lb.	.68 -	.78
182* (dms.)	lb.	.74 -	.78
200* (dms.)	lb.	1.33 -	1.43
203* (dms.)	lb.	.94 -	.98
211* (dms.)	lb.	.65 -	.75
221* (dms.)	lb.	1.51 -	1.61
541* (dms.)	lb.	.35½ -	.39½
541A* (dms.)	lb.	.81¾ -	.85¾
620* (dms.)	lb.	— -	.77½
700* (dms.)	lb.	.48¾ -	.58¾
900* (dms.)	lb.	.90 -	.94
903* (dms.)	lb.	.65 -	.69
909* (dms.)	lb.	1.02¾ -	1.12¾
920*	lb.	— -	.98
931* (dms.)	lb.	.75¾ -	.85¾
1203* (dms.)	lb.	1.30 -	1.34
1206* (dms.)	lb.	1.23 -	1.27
1820* (dms.)	lb.	.90 -	.94
Harshaw 1-V-3*	lb.	— -	.43
1-V-4*	lb.	— -	.68
1-V-7*	lb.	— -	.66
2-V-4*	lb.	— -	.85
2-V-7*	lb.	— -	1.10
2-V-8*	lb.	— -	1.30
2-V-400*	lb.	— -	.80
5-V-1*	lb.	— -	.41
5-V-22*	lb.	— -	.49
7-V-1*	lb.	— -	.90
7-V-2*	lb.	— -	.95
7-V-4*	lb.	— -	1.18
8-V-1*	lb.	— -	1.10
8-V-5*	lb.	— -	.80
8-V-100*	lb.	— -	.84
9-V-1*	lb.	— -	.76
12-V-5*	lb.	— -	.75
22-V-1*	lb.	— -	1.28
24-V-1*	lb.	— -	1.28
28-V-2*	lb.	— -	1.18
128-V-5*	lb.	— -	.86
281-V-4*	lb.	— -	.90

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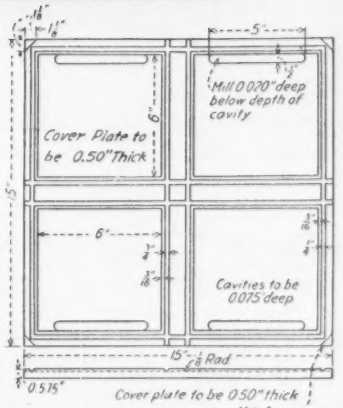
Cover Plate to be 0.50" Thick
Mill 0.020" deep below depth of cavity
Cavities to be 0.075 deep
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Mill four corners 1/8 deep for prying mold apart

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STABILIZING AGENTS (Cont'd)

Lithium Stearate	lb.	.57	.62
Metasap 613-A*	lb.	——	.69
613-B*	lb.	——	.84
613-C*	lb.	——	1.06
621*	lb.	——	.88
Modicol N*	lb.	.41½	.42½
S*	lb.	.30⅜	.31⅜
Sodium Silicates	cwt.	1.00	5.25
Stabelan E*	lb.	1.35	1.50
XL*	lb.	.55	.65
HR-50*	lb.	.75	.90
HR Liquid*	lb.	.65	.75
HR Paste*	lb.	.85	.95
HR Powder*	lb.	.95	1.05
Stabilizer No. 3*	lb.	1.90	2.00
No. 42*	lb.	.83	.93
No. 52*	lb.	1.90	2.00
No. 89X*	lb.	.75	.80
No. 143*	lb.	.80	.90
BC-12*	lb.	.87	.95
B-5*	lb.	——	.70
CH-14*	lb.	——	.65
CH-20*	lb.	——	.65
E6B*	lb.	——	.95
E-49*	lb.	——	.60
E-98*	lb.	——	.55
G-1*	lb.	1.25	1.40
HR*	lb.	.85	.89
JCX*	lb.	——	.63
L*	lb.	——	.60
OM-10*	lb.	——	1.95
OM-18*	lb.	——	3.25
SN*	lb.	——	.48
V-1-N*	lb.	——	.43
VL-3*	lb.	——	1.00
Staflex OY*	lb.	——	1.20
QXMA*	lb.	——	.70
Stayrite 10*	lb.	.32	.37
P-10*	lb.	.39	.44
15*	lb.	.53	.58
20*	lb.	.37	.42
22*	lb.	1.30	1.34
25*	lb.	.35	.40
70*	lb.	.68	.70
71*	lb.	.88	.90
75*	lb.	.68	.70
76*	lb.	.58	.60
80*	lb.	.68	.70
90*	lb.	.68	.70
95*	lb.	.68	.70
229*	lb.	.45	.50
Vanstay L*	lb.	.33	.35
H.T.*	lb.	.90	.92
S*	lb.	.63	.65

STIFFENING AGENTS

Stiffening Agent 710*	lb.	——	.88

SUN CHECKING AGENTS

Allied AA-1144*	lb.	.23	.24
AA-1177*	lb.	.15½	.16½
Antisol*	lb.	——	.23
Antisun* (Chipped)	lb.	.15½	.17½
(Slabbed)	lb.	.15	.17
Heliozone*	lb.	.30	.31
Microflake*	lb.	.20	.24
NBC*	lb.	——	1.55
Ross Sunproofing Waxes*	lb.	——	.13½
Sonolite 100*	lb.	.17	.22
127*	lb.	.16½	.20½
154*	lb.	.23	.25
Sunproof*	lb.	.31	.32
713*	lb.	.25	.26
Improved*	lb.	.25	.26
Super*	lb.	.40	.41
Jr.*	lb.	.20	.21
Tonox*	lb.	.52	.54

SURFACE ACTIVE AGENTS

Aquarex D*	lb.	——	.78
MDL*	lb.	——	.33
ME*	lb.	——	.80
NS*	lb.	——	.60
SMO*	lb.	——	.50
WAQ*	lb.	——	.22
Emulphor EL-620*	lb.	——	.40
Igepal CO-730*	lb.	——	.29
CO-850*	lb.	——	.29
CO-880*	lb.	——	.29
Igepon CN-42*	lb.	——	.25
T-77*	lb.	——	.49
Kessco 50201*	lb.	——	.43½
50203*	lb.	——	.44
18201*	lb.	——	.38
18203*	lb.	——	.35¼
Pluronic L62*	lb.	.33½	.39
L64*	lb.	.33½	.39
Sellogen Gel*	lb.	——	.12¾

TACKIFIERS

Arcco 620-32B*	lb.	.20	.21
716-30*	lb.	.18	.19
1041-21*	lb.	.16½	.17½
Bunaweld Polymer No. 780*	lb.	——	.24
No. 5514*	lb.	——	.35
Galex* (dms.)	lb.	.15¼	.18
Indopol H-300*	gal.	1.00	1.21
Koresin*	lb.	——	.95
Liquid Rubber Flux*	lb.	——	.14
Nilox* (c.l.)	cwt.	——	14.50
Resin V	lb.	——	.23½
Synthol*	lb.	——	.24¼
Tackifier 1041-21*	lb.	.16½	.17½
Vistac No. 1*	gal	1.00	1.21
A*	lb.	.21½	.22¼
Zirex* (c.l.)	cwt.	——	14.75

THICKENERS (For Latex)

Alcogum AN-6*	lb.	——	.05
AN-10*	lb.	——	.08½
Betanol* (dms.)	lb.	.70	.95
Good-rite K-702*	lb.	.34½	.35
K-704*	lb.	.21	.22
K-705*	lb.	.31	.32
K-707*	lb.	.18	.19
K-708*	lb.	.29	.30
K-710*	lb.	.15	.16
Modicol VD*	lb.	.13⅜	.14⅜
VE*	lb.	.13⅜	.14⅜
Polyco 296 BT*	lb.	.15	.16
296-N*	lb.	.15	.16
530*	lb.	.15	.16
Propylene Laurate (dms.)	lb.	.57	.82
Sodium Silicate, 41°/1:3.2	cwt.	1.00	2.10

VULCANIZING AGENTS

Selenium

Vandex*	lb.	——	7.25

Sulfur

Aero Brand*	cwt.	——	2.40
Blackbird* (c.l.)	cwt.	——	2.85
Cloud* (c.l.)	cwt.	——	2.80
Crystex*	lb.	.19½	.23
Darex Dispersed Sulfur*	lb.	.14	.16
Devil A* (c.l.)	cwt.	——	2.40
Dispersed Sulfur	lb.	.14	.16
Insoluble Sulfur 60*	lb.	.12½	.13
Ko-Blend IS*	lb.	——	.39
Mist* (Wettable) (c.l.)	cwt.	——	4.00
Spider* (c.l.)	cwt.	——	2.80
Star* (c.l.)	cwt.	——	3.25
Sulfasan R*	lb.	——	1.50
Tire* (c.l.)	cwt.	——	2.40
Tube* (c.l.)	cwt.	——	3.25
Vultac 2*	lb.	.47	.49
3*	lb.	.51	.53

VULCANIZING AGENTS (Cont'd)

Tellurium

Telloy*	lb.	——	2.50

WETTING AGENTS

Advawet No. 10*	lb.	——	.20
No. 33*	lb.	——	.48
Aerosol 18*	lb.	——	.40
AY*	lb.	1.00	1.20
MA 80%*	lb.	.67	.72
OT 75% Aqueous*	lb.	.63	.68
OT 100%*	lb.	1.00	1.20
Alrosal* (dms.)	lb.	——	.40
Alrosperse*	lb.	——	.18
Areskap 50*	lb.	.30	.38
Dry 100*	lb.	.60	.72
Aresket Dry 300*	lb.	.60	.72
Aresklene 375*	lb.	.42	.57
Armacs*	lb.	.28	.77
Arquads*	lb.	.24	.60
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5130* (dms.)	lb.	——	.30
Etho-Chemicals*	lb.	.26	.58
Kesco E-122* (dms)	lb.	——	.45
18201*	lb.	——	.38
Krelson 8G* (dms.)	lb.	.26	.32
Lecithin	lb.	.13	.17
Modicol N*	lb.	.41½	.42½
S*	lb.	.30⅜	.31⅜
Orvus AB Granules*	lb.	.16	.17
Parnol*	lb.	.13	.18
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S*	lb.	.13	.25
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SF-78*	lb.	——	.30
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Stablex G*	lb.	.50	.70
Tergitol 4* (dms., dlvd.)	lb.	.32	.33
7* (dms., dlvd.)	lb.	.43	.44
O8* (dms., dlvd.)	lb.	.31	.32
P28* (dms., dlvd.)	lb.	.18½	.19
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Vultamol*	lb.	——	.17½
Wetsit Conc.*	lb.	.25	.28

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Aquesperse 30*	lb.	——	.11
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HB-20*	lb.	.16	.17
HB-40*	lb.	.23	.24
MODX*	lb.	.32½	.34½
BF*-13	lb.	——	.26½
Nullapon B-F-13*	lb.	——	.26½
BF-78*	lb.	——	.61½
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2702*	lb.	.04	.04½
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L*	lb.	.14	.16¾
N*	lb.	.15	.17¼
T*	lb.	.16½	.18¾
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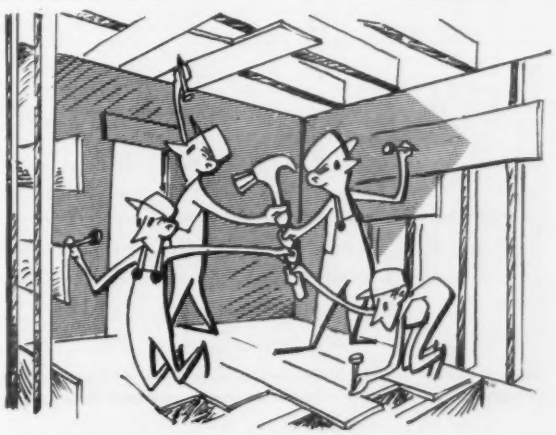

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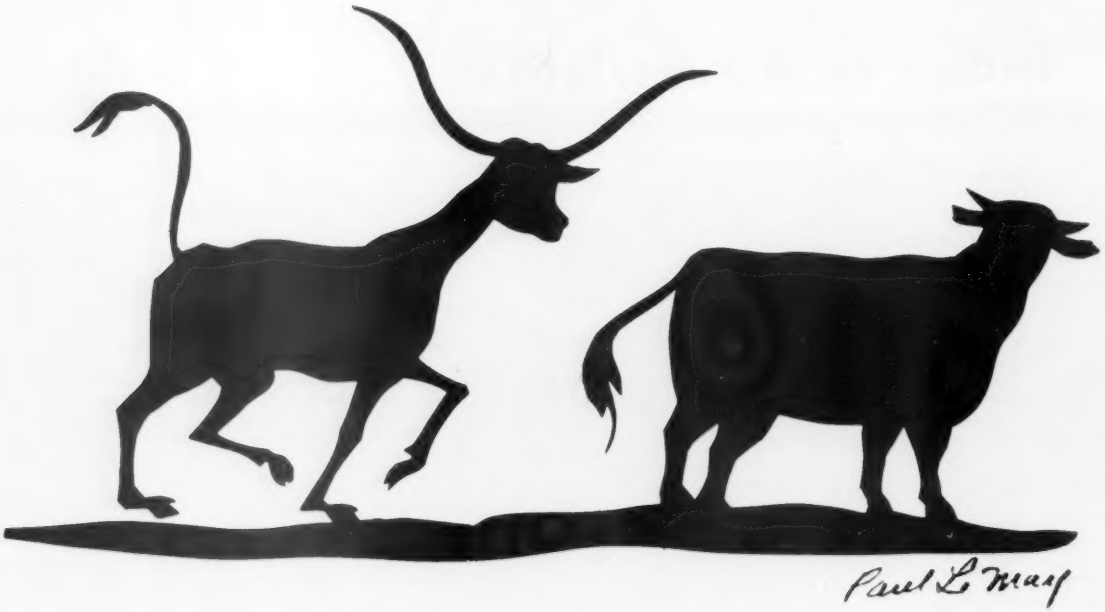

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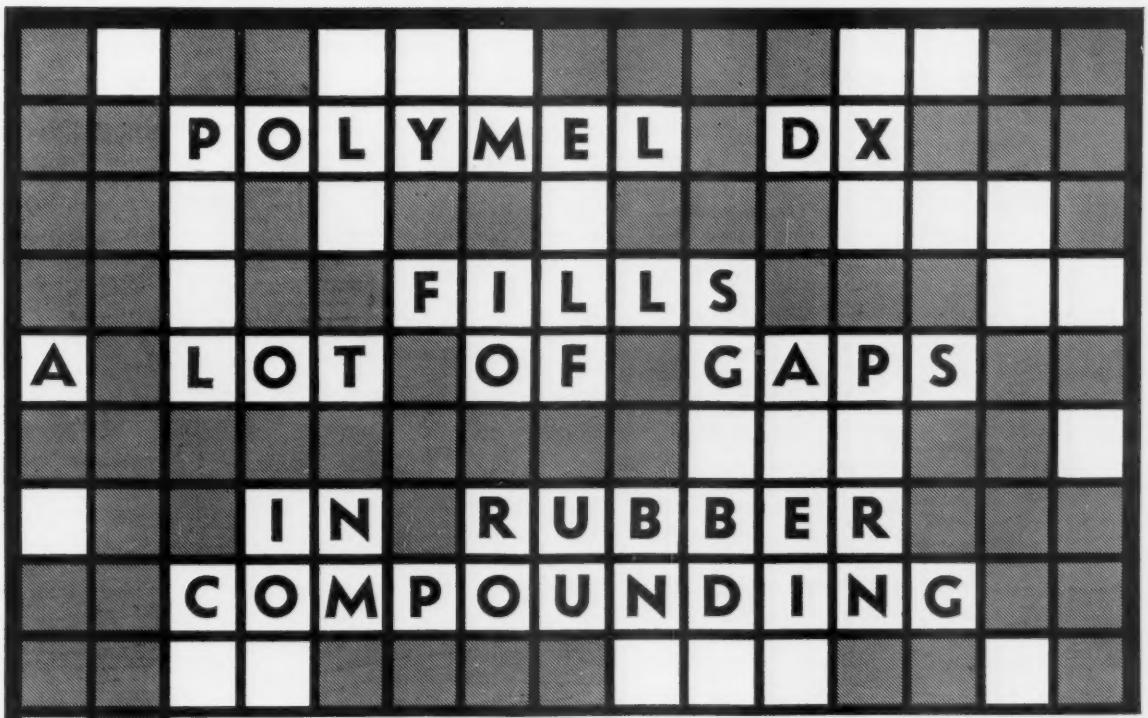

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